Information systems for the international accessibility of standards

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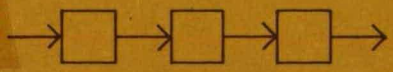
INFORMATION SYSTEMS

FOR THE INTERNATIONAL ACCESSIBILITY OF

STANDARDS

B. E. KUIPER



INFORMATION SYSTEMS FOR THE INTERNATIONAL ACCESSIBILITY OF STANDARDS

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INFORMATIESYSTEMEN
VOOR DE INTERNATIONALE TOEGANKELIJKHEID VAN
NORMEN

PROEFSCHRIFT
TER VERKRIJGING VAN DE GRAAD VAN DOCTOR IN DE
ECONOMISCHE WETENSCHAPPEN AAN DE
KATHOLIEKE HOGESCHOOL TE TILBURG,
OP GEZAG VAN DE RECTOR MAGNIFICUS
IN HET OPENBAAR TE VERDEDIGEN TEN OVERSTAAN
VAN EEN DOOR HET COLLEGE VAN DECANEN
AANGEWEZEN COMMISSIE IN DE AULA VAN DE HOGESCHOOL
OP DONDERDAG 18 SEPTEMBER 1975
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geboren te Puerto Mexico

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My wife and children have always endured with good grace the priority I gave to the writing of this dissertation.

Barteld E. Kuiper

Tilburg, June 1975.

AAN SJOUKJE,
WILLEM EN JENNY.

TABLE OF CONTENTS

ABBREVIATIONS USED

(numbers refer to sections)

ABD	Association Belge de Documentation
AFNOR	Association Française de Normalisation
AGRIS	International Information System for Agricultural Sciences and Technology
ANSI	American National Standards Institute
ASA	American Standards Association
ASAC	Asian Standards Advisory Committee (of the UN-ECAFE) ; 1.2
ASMO	Arab Standards and Measures Organization; 1.2
ASTM	American Society for Testing Materials
BISFA	International Bureau for the Standardization of Artificial Fibres; 1.2
BSI	British Standards Institution; 1.1
BSO	Broad System of Ordering
CAC	Codex Alimentarius Commission; 1.2; 1.3; 5.2.5
CARIS	Computerized Agricultural Research Information System
CAS	Chemical Abstract Service; 6.2.3
CCI	International Consultative Committee (Com.Cons.Int.)
CCIR	CCI for Radiocommunications
CCITT	CCI for Telephony and Telegraphy
CEE	Commission on rules for the approval of Electrotechnical Equipment; 1.2; 2.3.2
CEN	Comité Européen de Normalisation; 1.2
CENELEC	Comité Européen de Normalisation Electrotechnique (previously CENEL and CENELCOM); 1.2
CENEL	Comité Européen de Coordination des Normes dans la domaine Electrotechnique
CENELCOM	Comité Européen de Coordination des Normes dans la domaine Electrotechnique Communitaire
CICS	Committee for Index Cards for Standards
CIS	International Ocupational Safety and Health Information Centre
CISPR	International Special Committee on Radio-interference
CMEA	Council of Mutual Economic Assistance of the Socialist Countries; 1.2
COPANT	Comisión Panamericana de Normes Técnicas; 1.2
CSN	Urad pro normalizaci (Czecholovakian Standars Institute)
CSPFT	International Committee for the Standardization of Physical Fitness Tests; 1.2
DATRIX	Direct Access to Reference Information: a Xerox service; Annex 11
DNA	Deutscher Normenausschuss
DOS	Disc Operating System
ECSC	European Coal and Steel Community
ENO	Greek Standards Committee
ETC	European Translation Centre; 6.1.2.2.1
FAO	Food and Agricultural Organization; 1.2; 1.3; 5.2.5; 5.3; 6.1.3.6
FID	International Federation for Documentation; 1.2; 6.5.4
GOST	Gosudarstvennyi Komitet Standartov Soveta Ministrov SSSR
IAEA	International Atomic Energy Agency; 1.2; 1.3; 5.2.4; 5.3; 6.1.3.6; 6.2.3

IBI/ICC	Interorganization Board for Information systems/ International Computing Centre; 1.2; 6.1.3.9
IBM	International Business Machines
IBM OS	IBM-Operating System
IBM OS MFT	IBM-OS-Mutiple Fixed Tasks
IBN	Institut Belge de Normalisation
IBWM	International Bureau for Weights and Measures; 1.2; 5.2.1.1; 5.3; 6.1.3.5; 6.3
ICAO	International Civil Aviation Organization; 1.2; 1.3; 5.2.8; 5.3; 6.1.2.2.2; 6.1.3.5
ICS	Integrated Communication Subsystem
ICSHB	International Committee for Standardization in Human Biology; 1.2
ICSS	Integrated Communication and Storage Subsystem
ICSU	International Council of Scientific Unions;1.2
IDF	International Dairy Federation; 1.2
IEC	International Electrotechnical Commission; 1.1; 1.2; 1.3; 5.2.2.; 5.3; 6.1.3.4; 6.3; 6.5.1
IEV	International Electrotechnical Vocabulary
IFIP	International Federation for Information Processing ; 1.2
IFLA	International Federation of Library Associations; 1.2; 1.5
IGPAI	Repartição de Normalização (Portugal)
IIW	International Institute for Welding; 1.2
ILO	International Labour Office; 1.2; 1.3; 5.2.7; 5.3; 6.1.3.8
ILS	International Labour Standards
IMCO	Intergovernmental Maritime Consultative Organization; 1.2; 5.2.9; 5.3; 6.1.2.2.2; 6.1.3.5
IMOSIO	International Mission Oriented Standard Issuing Organization
INFCO	Standing Committee for the Study of Scientific and Technical Information on Standardization
INIS	International Nuclear Information System
IOLM	International Organization for Legal Metrology; 1.2; 5.2.1.2; 5.3; 6.1.3.1; 6.3
IRCSS	Integrated Reporting Communication and Storage Subsystem
ISA	International Federation of the National Standardizing Associations; 1.1
ISB	International Standards Body
ISBD(M)	International Standard Bibliographic Description for Monographic Publications
ISI	Indian Standards Institution
ISI-SCI	Institute of Scientific Information - Science Citation Index
ISIRI	Institute of Standards and Industrial Research of Iran
ISIS	Integrated Scientific Information System
ISO	International Organization for Standardization; 1.2; 2.1; 5.3; 6.3; 6.5.1; 6.6
ISO DIS	ISO Draft International Standard
ISO IS	ISO International Standard
ISO TC WG	ISO Technical Committee Working Group
ISO R	ISO Recommendation
ISS	Integrated Storage Subsystem
ITU	International Telecommunication Union; 1.2; 1.3; 5.2.3; 5.3; 6.1.3.5
IUR	International Union of Railways; 1.2
JISC	Japanese Industrial Standards Committee

KKCM	Committee for Quality, Standardization and Metrology (Bulgaria)
KWIC	Keyword in Context
MARC	Machine Readable Cataloguing
MEDLARS	Medical Literature Analysis and Retrieval System
MEDLINE	Medlars on line
MESH	Medical Subject Headings
MSZH	Magyar Szabványügyi Hivatal
NATO	North Atlantic Treaty Organization; 1.2
NCS	Netherlands Catalogue of Standards
NEN	Nederlandse Norm
NNI	Nederlands Normalisatie Instituut
NSB	National Standards Body
NSF	Norges Standardiserings Forbund
OCR	Optical Character Reader
OECD	Organization for Economic Cooperation and Development; 1.2
ON	Österreichisches Normungsinstitut
PKNiM	Polski Komitet Normalizacji i Miar
SDI	Selective Dessemination of Information
SFS	Suomen Standardisoimisliitto
SII	Standards Institution of Israel
SIS	Swedish Institute for Standardization
SRC	Subjectfield Reference Code
STAS	Oficiul de Stat pentru Standarde (Romania)
STI	Scientific and Technical Information
TEST	Thesaurus of Engineering and Scientific Terms
UIA	Union of International Associations; 1.2
UDC	Universal Decimal Classification
UFOD	Union Française des Organismes de Documentation
UN	United Nations
UNE	Spanish Standards Institute (Also IRANOR)
UNESCO	UN Educational, Scientific and Cultural Organization; 1.2; 1.5; 6.2.5
UNI	Ente Nazionale Italiano di Unificazione
UNIDO	UN Industrial Development Organization; 1.2
UNISIST	Universal System for Information in Science and Technology
UNSCC	UN Standards Coordinating Committee; 1.1
US	United States
USSR	Union of Socialist Sovjet Republics
WHO	World Health Organization; 1.2; 1.3; 5.2.6; 5.3; 6.1.3.7; 6.2.3
WCS	World Catalogue of Standards
WMO	World Meteorological Organization; 1.2; 1.3; 5.2.10; 5.3; 6.1.3.5

CHAPTER 1

INTRODUCTION TO THE FIELD OF STUDY

1.1 DELINEATION OF THE FIELD OF STUDY

When studying the international accessibility of standards, one desires a definition of a "standard" to define the field of study. Many definitions have been given, including one by J. Gaillard (1933), and reviewed by Elfriede Beier in 1960. Webster's New Collegiate Dictionary (1956) includes the following two definitions of a standard: "That which is set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality" and "That which is established by authority, custom or general consent as a model or example; criterion; test." The same dictionary gives for criterion the meaning "a standard of judging".
The ISO gives the following definition of a standard in its standardization vocabulary (ISO. Definitions 1. 1971):

> "The result of a particular standardization effort, approved by a recognized authority.
> It may take the form of
> (1) a document containing a set of conditions to be fulfilled (in French "norme")
> (2) a fundamental unit or physical constant, for example: ampere, meter, absolute zero (Kelvin) (In French "étalon".)"

L.C. Verman (1973) gives a third form:

> "(3) an object for physical comparison, for example: meter (in French "étalon")".

Standards are well-recognized as means of communication between producers and consumers. The consumers' organizations in particular recognize as beneficial the clarity of communication obtainable by standards; producers are likely to attach more importance to the fact that fewer types of products are required so production costs are lower, whilst governments tend to emphasize the protection that can be attained by the introduction of standards. D. Grogan (1971) considers standards a form of primary literature, representing new knowledge and constituting the latest available information.

The ISO vocabulary also gives a definition for standardization:

> "The process of formulating and applying rules for an orderly approach to a specific activity for the benefit and with the cooperation of all concerned and in particular for the promotion of optimum overall economy taking due account of functional conditions and safety requirements."

S.K. Sen (1971) is reported by L.C. Verman (1973) to have proposed the following definition:
"Standardization is the process by which systems and values are established in individual, group and social life by natural evolution, custom, authority or common consent which, by remaining (or being kept) invariable over a period of time in a changing environment of unlimited modality, provide the

stable basis essential for the growth and attainment of:

(a) social or group identity and survival,
(b) communication, understanding and exchange of ideas, goods and services between individuals and groups,
(c) knowledge and experience for further development, and
(d) consolidation of social, economic and technological attainments at any point of time so as to release creative energy for the search of higher and better values and systems."

The ISO definition of a standard requires that a standard be "approved by a recognized authority". This raises the question of what a recognized authority is. Presumably recognized to adopt standards. But recognized by whom? By official governmental organs? By branch organizations? By the designers of the standard? By the users of the standard? Sen rightly includes the possibility that systems and values are established by natural evolution. Systems and values which are established by natural evolution and which may or may not involve a particular standardization effort, fall outside the ISO definition until they have been adopted by a recognized authority. While it is true that the acceptance of a standard by an individual may be influenced by the authority and status of the issuing body, the recognition of the authority would seem to be in need of confirmation by the users of the standard. The users standardize, the recognized authorities offer standardizeability.

One peculiarity must be pointed out from the start. The variety of meanings given (expressed or implied) to the term "standard" in different countries, disciplines and international organizations, and the unpredictability of the exact type of normative instruction by which a particular substantial matter has issued (as national standard, as national or international recommendation, as law, directive, rule or regulation, as international convention, as registers of testing and inspection authorities, as code of practice, as specification or as guidelines or guiding principles) is a major factor itself, affecting the accessibility. To illustrate the problem: an exporter of matches may search standards catalogues of different countries for standards on matches. Reviewing his findings he will miss a Swedish standard. If he concludes that he may dump low-quality matches in a standardless Swedish market, he reckons outside the law. In Sweden, quality of matches is governed by law without reference to standards. This example could be supplemented by many others. Regulations, wherein the term standard may not be mentioned, may still be standardizing regulations or have standardization value. Defining a standard as voluntary, independent of the binding force which may be attached to it by law (c.f. D.Serwer, 1972), would not limit the study of accessibility, since the user searching for a standard does not know that what he actually needs is a law or regulation with standardization value. The question has been raised (NNI Discussiegroep Normalisatie en Wetgeving, 1973) whether the standards bodies are able and willing to act as central place for obtaining technical documents published by different authorities: technical regulations, rules, laws etc., for the convenience of the user who will then find all documentation at one place. In the present study this question will be modified: Whether standards bo-

dies should act as central place for obtaining reference information on all these documents which are of a primarily normative nature or have standardization value. Should national standards bodies be informed and give information about these documents regardless of their source and voluntary or binding nature? (See sections 1.7 and 6.6.2.1)

The study is further complicated by the fact that the words "standard" and "norm" are used also for social, ethical and cultural values.

The author has been told that lawyers understand the concept "norm" to mean the behaviour considered by a specific community to be desirable (Dutch: onder juristen is het begrip norm bekend als een in een bepaalde groep bestaande opvatting omtrent gewenst gedrag). Such a norm, when sanctioned by government, becomes a legal norm (Dutch: rechtsnorm) and may be considered a guideline for future behaviour as well as a yardstick (Dutch: maatstaf) for judging past behaviour. This dissertation neither confirms, supports, rejects nor detracts from this general concept of a legal norm, but deals with standards regardless of their legal nature.

The Codex Alimentarius Commission (CAC), set up to set food standards, is also involved in a code of ethics for international trade of food. Excluding these ethical and cultural values when defining a standard - as may be done for the purpose of this study - does not limit the study of accessibility, since the user searching for standards may not be able to tell the difference between ethical and technical standards when searching catalogues, subject indexes etc. To illustrate the problem: A labour manager having heard that the International Labour Office (ILO) issues standards dealing with the working environment, may look in the 1969-1971 Supplement to the ILO Catalogue and may find on page 6 the title "International standards and guiding principles, 1944 - 1968". After ordering the book he will find that the standards deal with employer-worker relations. Should he have known? Perhaps so, since this title appeared as No.34 in the Labour - Management Relations Series. (See sections 5.2.7 and 6.3 and 6.4).

In the following paragraph the organizations will be mentioned whose information systems will be included in this study ans whose published normative documents will be considered standards for the purpose of this study.

These include the following:

- The ISO and its member bodies (See ISO Memento 1973: Note: China is not currently among the member bodies of ISO). Publications of ISO designated as "Recommendations" are understood to be standard-recommendations not differing substantially from standards. If a standard from a non-ISO-organization is accepted by an ISO-organization it is considered as a standard of the ISO-organization.
- The IEC, an autonomous organization affiliated to the ISO as electrotechnical division.
- The IBWM and the ILOM.

  Note: The ISO, IEC, IBWM and IOLM will be referred to as International Standards Bodies (ISB's) and the member bodies of ISO as National

Standards Bodies (NSB's).

- The following standardizing special agencies of the United Nations: the FAO, ICAO, ILO, IMCO, ITU, WHO, and WMO; the IAEA, having special status with the UN; the CAC, wherein the FAO and the WHO are participating.
  Do these organizations issue standards as defined by the ISO definition (section 1.1), which stipulates they must be "approved by a recognized authority"?
  In this study these organizations will be considered recognized authorities in the context of this definition and the results of their standardization efforts will be considered standards. For the sake of brevity these organizations will be referred to as International Mission Oriented Standard Issuing Organizations (IMOSIO's).

These do not include the following:

- The regional standards organizations ASAC, ASMO, CQPANT, CEE, CEN, CENELEC and the CMEA Standards Committee.
- The standardizing organizations of less than worldwide scope EURATOM, NATO and OECD.
- The standardizing branch organizations of international or worldwide scope such as BISFA, CSPFT, ICSHB, IDF, IIW and IUR.
- Organizations which promote standardization, sometimes actively, without issuing standards, such as FID, IBI/ICC, ICSU, IFIP, IFLA, UIA, UNESCO and UNIDO. The omission of these organizations from this study, does not mean that their work will not be referred to.

The accessibility of standards also involves final draft-standards and they are included in the scope of this study. Proposals for standardization and early draft-standards may be referred to briefly in connection with planning procedures.

This study does not cover information systems for the accessibility of literature on standardization, such as articles in periodicals, books, theses, etc. It is concerned only with standards and draft standards themselves. Systems dealing, exclusively or among other things, with literature on standardization, such as ISO-INTERNORM, FAO-CARIS and the UDC section for documents on standardization, are not discussed.

This study extends over a period of time up to and including the year 1973 and does not cover the years 1974 and following.

No attempt is made in this dissertation to tell the users which standards are to be found where.

1.2 GENERAL INTRODUCTION

The significance of standards as means of communication and carriers of scientific and technical information is well-known, as well as the necessity to apply common standards when designing networks of information, automated or manual.

Since the foundation of national standards bodies, in the beginning of the twentieth century, standards have grown not only in number, but also in the scope of fields covered.

Along with the growth in scope, the users grew in number and variety and it became more difficult to bring the specific user together with the standards of his field of interest. As a consequence of the general increase of international contacts, the problem is not limited to domestic users, but extends across the borders. In general different countries have different standards, although some standards just happen to be the same, some have been made the same by harmonization, and some have issued from the start as international standards. By retrieving and displaying the standards of different nations on a certain subject an international information system for standards facilitates the process of harmonization by which unnecessary differences are eliminated and necessary differences are sustained or introduced. The need for information on standards of different nations on a certain subject disappears when the existence of a single harmonized international standard becomes known.

Access across national borders has been a major objective for the design of international information systems for standards and a minor objective for the design of a few national information systems for standards. Among these are the CICS system, the NCS system, the WCS system, the systems of (other) ISB's and (other) IMOSIO's.

The historical background of standardization has been reviewed by L.C. Verman (1973). The first national standards body (NSB) was founded in the year 1901: The forerunner of the British Standards Institution (BSI); the first international standards body (ISB) in the year 1906: The International Electrotechnical Commission (IEC). Other national standards bodies were founded after the beginning of the first world war and in 1926 twenty were in existence, a majority of which founded together the International Federation of National Standardizing Associations (ISA). Its purpose was the systematic exchange of information on standardization work accomplished or in course of development in different countries affiliated with it and the promotion of uniformity between national standards set up in different countries if such uniformity appeared to be desirable and practicable (See J. Gaillard 1933). During the second world war, in 1942, ISA ceased work. Standardization, mainly of war material, was coordinated by the United Nations Standards Coordinating Committee (UNSCC), comprising 18 allied countries. After the war, in 1946, it proposed the foundation of the International Organization for Standardization (ISO), which was founded officially in 1947 after 15 countries has ratified the foundation. The Constitution defines its object: to promote the development of standards in the world with a view to facilitating international exchange of goods and services and to develop cooperation in the sphere of intellectual, scientific, technological and economic activity. The means indicated to this end were: recommendations to Member Bodies for coordination and unification of national standards, international standards, exchange of information regarding work of its Member Bodies and of its Technical Committees, cooperation with other international organizations interested in related matters.

In 1948 the ISO Council agreed that Member Bodies should be asked to indicate the numbers of the Universal Decimal Clas-

sification (UDC) on their standards and to send to the General Secretariat copies of each new standard published and also index-cards bearing titles, UDC numbers and short summaries in English, French or Russian. The index-cards were also exchanged between some Member Bodies. This system of exchange of index cards for standards, which was partially operative from the year 1947 until 1971 is a part of this study (Chapter 2). The system intended to facilitate the bringing together of the standards of different countries on a specific subject and the user having specific interest in that subject. The link was made by referring to the bibliographic information, UDC number and abstract. When desired, the standard itself was added. The card index served as a source of reference information.

Another source of reference information is the catalogue of standards in book form. Catalogues of standards are exchanged between national standards bodies, as are the standards themselves.

As the standards issued annually grew in number and in coverage, the users grew in variety. The following groups have been reported to be users or recipiants of standards (See also section 4.4):

- industrial enterprises, national and international, requiring standards for production, for export etc.
- associations of enterprises within a branch
- educational institutions, for state of the art
- standardization committees, national and international (See Kulkarni 1968)
- legal departments, when reference to standards or referral to the NSB's is made in laws
- government authorities inspecting quality of goods
- developing countries not having standards of their own, and dependent on standards from abroad.

Industrial enterprises have given standards a place in their documentary systems for controlling their products. In these systems J. Ollner (1974) distinguishes (paraphrased):

- design data including standards as orders of a technical character
- production data including specifications and drawings both referring to standards, and - sometimes - standards used directly
- sales data including catalogues and product descriptions both referring to standards and - sometimes - standards used directly.

The standardization committees occupy a special place among the users of standards. Comparitive data on standards are essential for standardization work itself. In drafting a standard the experience with varying national standards may be essential to indicate the optimum or to define an optimum as a function of variables. The exchange of information taking place among specialists in the standardization committees includes the international exchange of standards.

To make the growing variety and quantity of standards accessible to a growing variety and number of users, a small number of standards bodies studies the possibility of using

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To make the growing variety and quantity of standards accessible to a growing variety and number of users, a small number of standards bodies studies the possibility of using

documents. Documents other than standards and related normative documents may include documents on standardization.

These distinctions will be applied to the inputs of the information systems of NSB's, ISB's and IMOSIO's in the following paragraphs.

General and national: The input to the information systems of the national standards bodies is usually general or unlimited as to subject field and mostly national (comprising standards issued by the own standards body).

General and international: For input of standards issued by others than the own NSB, the systems of the NSB's usually rely on the outputs of other systems, apparently without merging the foreign output with own national input. For example: the reference information on national standards of one country, put out in the form of a national catalogue of standards of that country, is usually relied upon by another country without accepting it as input in its own system, i.e. without re-inputting. A merged output is not usually obtained but exceptional merged outputs will be mentioned in section 4.5.

Limited and international: The inputs of the information systems of IEC, CAC, FAO, IAEA, ICAO, ILO, ITU, WHO and WMO, all organization issuing standards or normative technical documents, are limited by discipline or mission and are international, comprising the documents (including standards or normative technical documents) of their own organization (as is the case with IEC, CAC, ICAO, ITU and WMO), sometimes among documents from other organizations within the same mission (as is the case with FAO, IAEA, ILO and WHO).

Limited and multinational: The input of the information systems of the IAEA - INIS and FAO - AGRIS is limited to the nuclear and agricultural missions, of the IAEA and FAO respectively, and is multinational, comprising documents (including standards) of participating countries.

International, general and multinational: The scope of an ISO information system could possibly be to receive input, readable by man or machine (preferably by man and machine), of standards and related normative documents, which input is international (including international standards and recommendations), general (not limited by discipline or mission) and multinational (including national standards by all ISO Member Bodies and preferrably by all NSB's). In other words the scope could be to receive input from all national and international organizations issuing standards including all NSB's, ISB's and IMOSIO's.

For variations in scope due to different meanings of the word "standard" see section 1.1.

1.4 GENERAL APPROACH TO THE DESIGN AND IMPLEMENTATION OF INFORMATION SYSTEMS

In principle, as method of study an approach has been followed - with some concessions, however, to international

circumstances - which has been described by G.C. Nielen (1971) using the scheme of figure 1:

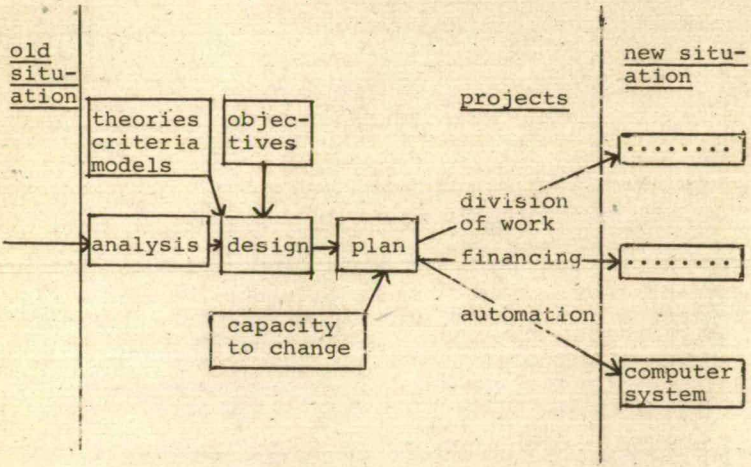


FIGURE 1

The situation prevailing at the beginning of the study may be called the "old situation". An analysis of the old situation yields factual data on information streams. An evaluation of the old situation with the aid of criteria (significant characteristics, formulated or not) will show the weaknesses of the old situation. The objectives may be formulated independently or may consist of improvements of the old situation by elimination of its weaknesses. With knowledge of theories, if any, and by using models, a design is created. A plan is made to implement the design. Here the capacity to change of the elements of the old situation, play an important role. To the extent to which the capacity to change is lacking, the new situation will deviate from the design. The design must take into account the analysis of the old situation; the plan must take into account the capacity to change. If the analysis is incomplete, an uncertainty is introduced into the design; if the capacity to change is unknown, an uncertainty is introduced into the plan. To obtain the new situation from the plan, the plan is divided into projects, which are executable separately, but must be collateral. One project may be automation: if the plan has been formulated in sufficient detail, automation is possible, and is done in a separate project. Other projects are financing, obtaining permission or agreement, supply of personnal or international division of work, etc. In this study the projects of reaching agreement and harmonization and of automation will receive some attention.

While the scheme of figure 1 is applicable in the environment of national and international standardization, it can in this environment not be seen as an isolatable one-time process to be controlled by an information scientist. The scheme should be seen rather as a repeating process or cycle

wherein the new situation of the first cycle will be the old situation of the second, etc. In fact the second cycle may start before the first has been completed. Here is indeed relevant what G.C. Nielen wrote in 1969, drawing attention to the temporary nature of each information system:

"In view of the requirement of constant reorganization of a modular management structure it does not seem realistic to us to believe that a system could be so designed that it could follow changes in the models used, changes in the formation of modules and changes in the procedures without substantial reconstructions. We prefer to recognize the limitation of each system in space and time. Each system has than at least one predecessor and at least one successor; a system may expect input from at least one sending system and should contribute output to at least one receiving system. See figure 2.

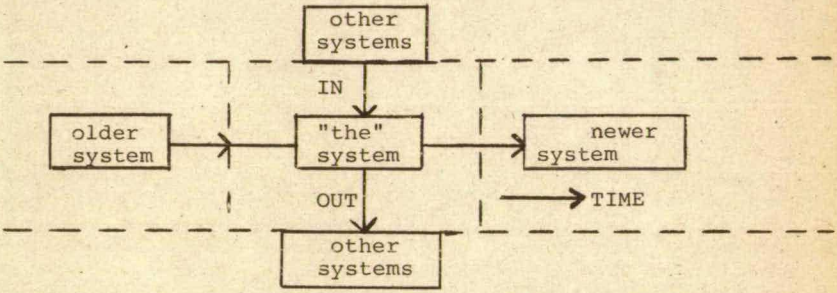


FIGURE 2 "The touching points of a new sytem"

Dealing with design and implementation of new information systems, G.C. Nielen furhter states in Oct. 1970:

"Both the dynamics in human and technological development and the always appearing new possibilities of data-processing are reason to review the information systems again and again. ... If a new system remains long in development, it will not meet the requirements, no matter how carefully they have been identified at the beginning of the design activity. ... The lifetime of information systems is short and their specificity is great, but there are undoubtedly subsystems of longer duration and more universal character. We will have to find these subsystems if we don't want to redesign each system in its entirety."

While these words are generally pertinent to any international information system, they are particularly applicable to the systems for reference information on standards discussed in this study.

Returning to figure 1, the capacity to change is difficult to estimate in the environment of national standardization, and even more so in the environment of international standardization. Therefore the implementability of a system even when agreed upon, is difficult to predict. A minority of countries operate with quickly changing advanced information processing equipment and a (perhaps decreasing) majority of countries work substantially without any equipment. The natio-

nal information systems on standards change one by one and substantially independently of each other. Any existing situation as regards information systems is already old before an analysis may be completed. The analysis needed would be a continuous one. In view of the time factor involved a preliminary or incomplete analysis of information systems on standards which is quick and may quickly result, through flexible design and plan, in a new situation, is more usable than a more complete analysis which takes so much time that the old situation has changed autonomously even before the analysis is complete. When for the execution of the plan a computer is used, then the possibilities for quick and continuous analyses in the next cycle are likely to be better than in the previous one. In the national cycle (chapter 3) of this study, as well as the international cycle (section 4.5) the analysis of the existing situation was supplemented by intuition. The capacity to change in both cases was estimated too optimistically.

The criteria (characteristics, significant in the environment) and models are also liable to change over longer periods of time. Criteria and models for documentation and information systems are translated eventually, when desired, by the standardizers into standards for these systems, a process which is in progress and which extends over many years. In other words: criteria and models belong, among other things, to the working field of the standardizers. When the standards are once established, then the standards bodies are expected to set an example in applying the standards. So the information and documentation systems of the standards bodies will conform to the newly established standards. In an early cycle of figure 2 the criteria may be poorly known and the corresponding standards non-existing. Then one may apply in one's own house, so to speak, one's own home-made standards as a preliminary measure, to base the design on. When design and plan have resulted in a new situation, the new standards may become gradually known from the standardization committees; they are likely to deviate somehow from the home-made preliminary standards, thereby necessitating alterations. On the one hand this shows the desirability of a design as flexible as possible, which may absorb as many changes in criteria, models and standards as possible, without need to change the design itself; on the other hand it again shows the necessity in this environment to apply the approach of figure 1 in successive cycles, as indicated in figure 2.

Theories, if any, could contribute to the drafting of a design. With the aid of a well-developed and sufficiently accessible theory the above-mentioned problems in analysis, criteria, models and standards could conceivably be solved by recourse to the theory. The theory would make it less speculative to supplement analysis by intuition, less urgent to build flexibility into the design and less fatiguing to go through successive cycles. In the years 1968-1973 the available theory was insufficiently comprehensive to be used in the desired designs, although the work of pertinent FID committees should be mentioned in this context with great appreciation, and will be cited frequently in this study.

Objectives which an information scientist would wish for himself when designing an international information system for standards, would look far ahead, be broad in scope and

clear in specification. Like the design and plan, however, the objectives are dependent here on international agreement between autonomous national standards bodies, each pursuing his own national objectives as regards information which may or may not have been made known. Because of the international agreement required, the information scientist will, for his international information system, look for maximum touching points with the national objectives as known or as implied by the designs of national information systems. In practice this means that he will choose his international objectives ad-hoc, pragmatically starting from the obvious defects of the existing situation. This does not only apply to the objectives, but also, mutatis mutandis, to design, plan and automation project. Due to the lack of definite, clearly formulated, reliable objectives, the plan for an international information system for standards has been liable to many changes. Since the execution of the plan is necessarily based on the voluntary participation of national standards bodies at an unspecifiable moment of time in the future, any international multi-yearplan for an information system for standards should show the greatest possible flexibility to allow for variations ad-hoc following the varying national plans and interests. This picture does not mean to describe an ideal model for planning, but rather the prevailing circumstances in the years 1969 - 1973 as regards the international information system for standards.

The automation project and the resulting computer system for information must take into account the voluntary nature of the participation and the limitations of financial nature. The sacrifices asked from the national bodies participating should be kept as little as possible, in particular as regards modifying any established codes, classifications, forms of presentation etc. On the other hand, almost every participating standards body will be willing to let the others convert to the system developed by itself, nationally. The computer system which is best under the circumstances will be determined also by computer equipment and computer service available on the market. These have changed considerably in the years 1969 - 1973.

1.5 STANDARDIZATION FOR DOCUMENTATION AND FOR INFORMATION PROCESSING

E.J. French et al. (1974) point out that all standards may be regarded as means of communicating information, (See also section 1.1) while certain standards govern methods of communication between information procedures, distributers and users. Among these are the standards for documentation and information processing.

Accessibility of standards involves the documentation of standards and the processing of reference information (manually or by machine). At first sight the standardization for documentation and for information processing would seem to fall outside the scope of this study. However, in order to improve the international accessibility of documentation and information processing systems dealing with standards, an international standardization of documentation and information processing techniques is instrumental. To the extent that

this is the case, standardization in these fields is a part of this study. The accessibility of reference information on standards is dependent, inter alia, on the compatibility of inputs, of outputs and of outputs as re-input in the information systems. It will hardly involve compatibility of programmes or programming, if indeed it involves them at all.

Standardization for information processing was reviewed by Marjorie F. Hill (1972).

Some major points in the history of standardization for documentation are the following. In 1895 the Universal Decimal Classification (UDC) was conceived by Paul Otlet and Henri La Fontaine as basis for a card index of world literature (See Bakewell, K.G.B. 1969) and has been used since that time for cataloguing to indicate classified subject fields. Cataloguing itself was discussed at the International Conference on Cataloguing Principles in Paris, 1962, organized by the Committee on Cataloguing of the International Federation of Library Associations (IFLA), which resulted in the Paris Statement of Principles, limiting the choice and form of headings and entry-words, i.e. the principle elements determining the order of entries under author's name or title in catalogues wherein entries are combined in one alphabetical sequence (IFLA 1962). The standardization of documentation, libraries and related information handling, including information systems and interchange networks as applied to documentation, is the domain of ISO Technical Committee 46, Documentation (founded in 1948). The committee has 15 subcommittees or working groups. Among the standards from this committee is the International Standard ISO 2709 Documentation - Format for bibliographic information interchange on magnetic tape, issued july 1973. In 1966 the Library of Congress started operation of an experiment in machine-readable-cataloguing (MARC) to produce a standardized machine-readable catalogue record that can be manipulated and reformatted in different installations to serve local practices and needs, including, inter alia, standards of bibliographic description, a tape record format, and procedures and programmes for data conversion. (See Library and Technical Services, vol 12, nr 3 Summer 1968, articles by H.D. Avram, J.F. Knapp, T.E. Leach, P.E. Parker, L.C. Rather and P.A. Simmons). In 1969 D. Martin looked into the different ways in which a data base of bibliographic records may be exploited for secondary publications, exchange of information and retrospective searching, and dealt with the question why standards are important in a computer-based system of this kind. He stated that each record would contain a number of data elements which together would form a complete identification of the original document and its source and an adequate description of its subject content. He considered it essential that the data elements should be stored in a standard form, in order to search, match and retrieve within the system and in order to exchange machine-readable files with other centres. The unique identification number for any document must be in such a form that any system handling the same document will refer to it in the same way. Specific and well-defined standard forms are required for each one of the data elements, particularly if they are to be a permissible key for retrieval. A state of the art review of standardization for documentation and information processing was given by

B. Houghton, editor (1969), including the above-mentioned contributions by D. Martin and H.G.B. Bakewell. In 1972 the UNESCO issued a report by eight experts "International standardization of library and documentation techniques", reporting on material up to 31 January 1970. It is interesting to note what the documentalists and librarians write in this report on the accessibility and dissemination of standards in the field of library and documentation techniques. On pages 18 and 19 under the heading "Dificient knowledge of standards" one reads:

"The greatest difficulty encountered in standardization is, however, that the standards issued may remain almost unknown, to a considerable number of interested parties (M. Curcaneanu, 1968). This is because, on the one hand, standardization of library and documentation techniques covers such a vast area of activities that the interested institutions (libraries, documentation centres, publishing and printing houses) do not always possess complete information of the publication of national standards or international recommendations which apply to their respective fields of activities. The parties concerned outnumber those in the other standardized fields since the number of users, running into hundreds of millions, cannot be left out of consideration. yet the mere fact that a standard has been issued by the Bureau of standards of their own country or by the ISO, will hardly guarantee their being kept informed."

In the report it is indicated that, in order to make all parties concerned acquainted with national standards and international recommendations, one of the most effective means would be to issue a collection (corpus) covering national standards as well as the recommendations of the ISO in the fields of librarianship and documentation. Reading this report one may question how information scientists will find the standards of interest to their clients, when they have so much difficulty in finding the standards of interest to themselves.

The work of the IFLA Committee on Cataloguing was reported by Dorothy Anderson in March 1973. This work resulted, inter alia, in the International Standard Bibliographic Description for Monographic Publications (ISBD(M), preliminary edition 1971, first standard edition March 1974. The preliminary edition of ISBD(M) was criticized by G.Swanson (1973) in an article entitled "ISBDM Standard or secret?". Swanson pointed out that the draft of the ISBD(M) was difficult to acquire, no copies having been for sale at the American Library Association, and stated that a modification to current cataloguing practice with potential effects on all librarians and users must be thoroughly publicized and carefully examined prior to adoption. He explained the modifications of computerprogrammes required for libraries with computer-based systems, in particular those using MARC records. He also pointed out that ISBD(M) was not considered by the recognized standards associations (ISO and ANSI) and that in spite of its title the 1971 edition was actually not a standard, but just a recommendation by a working group. Swanson's article illustrates the importance of standardization for documentation and information processing, the importance of a clear definition of what is a standard, and the importance of studying the accessibility of draft standards at different levels of acceptance and at different levels of standardization (international, branch,etc.).

The question of an international standard bibliographic description for monographs falls within the scope of the ISO Technical Committee 46 Documentation, working group Bibliographic filing arrangements (R.Coward 1973).

1.6 STANDARDIZATION AND DESTANDARDIZATION

Standardization has been defined in section 1.1. Destandardization is the abandonment of existing standards. The abandonment may be formal withdrawal of the paper (with or without substantial implementation) or it may be discontinuation of the actual practice. In other words: destandardization may take place in potentiality and in reality. When an old standard is abandoned on paper, in the real world the products conforming to the old standard may continue their life for decennia, in old buildings, old cars and ships, old archives etc.

When a new standard is drafted, the starting situation may be one of the following three:

A - no standard on the specific subject exists in the country or anywhere, either on paper or in fact. New and original standardization, respectively, are involved.
B - a standard has grown naturally in time and space, without having been defined or made accessible. Revision of a natural standard is involved.
C - an old standard on the same specific subject has been adopted previously. Revision of a formal standard is involved.

In general the adoption of a new standard involves, inter alia, the following vital functions:

	applicable for:
1 - observing and defining the old standard	B
2 - destandardizing the old standard	B C
and defining the new standard both on paper.	A B C
3 - withdrawal of the old standard	C
and offering access to the new standard	A B C
4 - using access to the new standard (by the one who may apply the standard)	A B C
5 - applying the new standard	A B C

The starting situations (A,B,C) may be more complex when old and new standards cover the same subject partially.

The vital functions (1,2,3,4,5) are more complex when in different countries the situations A,B and C are found on the same subject and the standardizers in one country may want to take into account the situations in the other countries. When the new standard will be an international one, the required functions in each country vary accordingly. For the drafting, adoption and implementation of the international standards it will be required that the starting situation in each country be known and that the new standards be made accessible in each country. The information systems perform these functions which are vital to standardization. Starting situations, however, cannot completely be known from existing national and international standards and draft standards alone, and for performing the vital functions, the information systems should ideally cover standards at all levels, i.e. at international, national, branch, company and house level (compare Swanson, 1973, cited in section 1.5). If necessary, this coverage may be limited to referral-service only. (section 6.6.2).

Standardization implies centralization, because standard

elements must be defined at one single point (G.C. Nielen 1972). Destandardization, as withdrawal of formal papers, likewise implies action at one single spot, and in this sense also implies centralization. Destandardization as abandonment of actual practice, however, implies that choices previously made by following the standard must be made from then on at multiple places; in this sense destandardization implies decentralization.

Z.S. Zannetos writes in 1965:
"Once knowledge is acquired, there will be a necessity for a centralized structure to spread the benefits of such knowledge. Mass education and production require central planning and standard procedures. One must leave room, however, so that the next breakthrough, which will destroy the existing standard procedures, can develop. All this implies that a viable and progressive organization must go through continuous cycles alternating between centralization and decentralization. Alternatively, it must separate the innovating from the mass-producing activities leaving the former decentralized and the latter centralized."

O. Kienzle writes in 1950 about standards:
"Normen sind Haltepunkte in der menschlichen Entwicklung; sie verarbeiten das in Freiheit Gewachsene zu gemeinsamer Klarheit, damit es sich auf neuer Ebene segenreich auswirke, hier in der Ruhe der Ordnung, dort in der Ungestörtheit wirtschaftlicher Fertigung. Daneben geht der freie Gedanke weiter. Er lässt Genormtes zeitweise unter seiner Bewusstseinsschwelle, lässt es eine Zeit lang "gegeben" sein und wendet sich neuen Aufgaben zu. Dann aber schwingt der Gedanke zurück, überprüft die Norm, auf der er aufgebaut hat, und passt sie dem Leben immer wieder neu an. Diesen Rhythmus zwischen Freiheit und Bindung gilt es zu begreifen."

Analogous to the favourable effect in management postulated by Zannetos to result from alternating or concurring centralization and decentralization, a favourable effect may be postulated to result from concurring standardization and destandardization. The separation of innovating from mass-producing activities is to be preferred above continuous cycles of the mass-producing activities, alternating between standardization and destandardization. These cycles imply that existing standards are no longer adhered to and become formally or de-facto abandoned (or substantially so), giving freedom to search for new and better standards. While examples of this cycling phenomenon may perhaps be found, they must be considered as less fortunate compared to the separation of innovating functions. In the destandardization period substantially no standard prevails, which may lead to a situation farther removed from the optimum (between understandardization and overstandardization) than maintaining the existing standard would. The freedom to experiment and to find the knowledge required for setting the new standard should be created by separation in space rather than in time: a small section should be singled out for experimentation, not hampered by the existing standards, in order to be prepared for the next revision of the standard. (When no standards exist, the experimentation may include an experimental standard of limited duration.) In this way there need not be an appreciable time period of de-

standardization between the old and the new or revised standard. Admittedly this depicts an ideal procedure. The consensus principle for adoption of standards(See S. Matuura 1973) implies the possibility for a large number of groups to try out any proposed new standard. Nevertheless the rule prevailing at most standards bodies is to bring up each standard every three or five years, or as often as required, for possible revision.

A standard must be both technically sound and politically acceptable. Standards technically sound may be politically unacceptable. They will not be implemented. Standards politically desired may be technically weak. They will not effect their purpose even when accepted and implemented. Technical soundness and political acceptability both depend on the environment, physical and political respectively. When the environment changes, the standard may have to be revised. Technical soundness of a standard refers to principles known in the physical sciences and implies specificity, operability, safety etc. Political acceptability refers to principles known in the political sciences and implies an orientation of cultural values, willingness to cooperate, reaching of agreement between all parties involved, etc. Revision of existing standards aims at timely adjusting of the standards to a changing physical and political environment.

Standardization as a tool of management may be compared to a car having three or four forward gears and one reverse gear. The car, when moving in its main direction, will undoubtedly be in one of the forward gears. Yet the reverse gear may be required to bring the car in a position from where the main forward movement can start, and therefore the reverse gear is essential for the main forward movement of the car. Similarly the tool of standardization has forward gears like consensus, agreement, adoption, acceptance and implementation. When moving in its main direction it will be in one of these gears. Its reverse gear is destandardization, required to reach a position from where the main forward movement may start. Without destandardization manouverability would be very low, and forward movement from certain positions would be impossible without undue pressures.

Standards are important for coherences, connections, interfaces, systems and system-interconnections, where different components need to fit together in a broader context. When these coherences change, the standards need to be reviewed for possible revision. Rarely may the experimentation be done by alternation in the entire system; usually the system must be simulated by some sort of small scale model.

Sen's definition of standardization (quoted in section 1.2) stipulates the consolidation provided in a changing environment by existing standards so as to release creative energy for the search of higher and better values and systems. A change in environment may make existing standards completely useless or partially superfluous. Applying hindsight to an older standard, it may seem to be overstandardized, and it may in fact have been partially destandardized during the revision.

Destandardization may take the form of shifting from relatively incidental towards more fundamental variables standardized. If insights in the art have developed quickly, the older standard may have to be abandoned entirely, which means complete destandardization, to make room for new or more fundamental standards. G.C. Nielen (1972) considers standardization of anything but concepts disputable. Verman (1973) warns against the dangers of overstandardization (at too early a time, at too high a level, involving too many characteristics, too narrow tolerances, too expensive test methods for non-available equipment). In any case the art of standardization requires from the standardizer that he standardizes exactly what is essential and nothing else. (Compare J. Ollner 1974). Since knowledge of what is essential depends on the state of the art whereto the standard belongs (chemistry, informatics, etc.) the necessity for periodic review of the standard is apparent. State of the art includes growth of concepts, principles and theories. Other circumstances necessitating revision of standards are given by R.C. Verman (1973).

In fields of science where new concepts, principles and theories are in the process of crystallizing out, the slowness of the standardization process for some standards may in part be due to the just desire to avoid overstandardization. The failure to implement some other standards after they have obtained consensus and have been adopted may in part be due to unintentional overstandardization.

The desirability of avoiding overstandardization and the useful function of destandardization should be kept in mind when planning for national and international standards in a new field like the environment. While it seems conceivable that some day in the future, when environmental science will have developed sufficiently, it will be possible to define uniform standards for immission (intake) on a world level for all countries, an attempt to do so, at a time when the environmental sciences have not yet completely clarified the essential parameters involved in the standardization, would seem in danger of overstandardization because of too high a level (world instead of local). Whenever the urgency of obtaining environmental standards justifies the drafting of a preliminary immission standard, it should be regularly reviewed for possible destandardization.

Recognizing the need for standards for fitting parts into a unit, the operation for obtaining standards involves the central function of setting the standards. An international standards body is the central authority for the participating national standards bodies as regards the main business of the drafting of international standards. Greater organizational decentralization is reportedly possible to the extent that there is a greater informational integration (FID Publication 506, p 129, 1974). The centralized operation of drafting international standards has higher information requirements to meet than a decentralized operation of drafting national standards. If some national standards or draft standards on the same subject exist already, the information required includes the information on the existing national standards or draft standards. This information may be supplied by an integrated reporting, communication and storage subsystem (IRCSS), as des-

cribed in section 6.3. Standardizers differ from the other users of standards in that they search for standards primarily as such, while the other users, most likely, search for standards primarily as documents of their own discipline, which documents, secondarily, happen to be standards.

An international information system for standards needs to be so designed that standardization and destandardization are equally accomodated. This necessarily includes the processing of revisions and abandonments. It preferably includes an analysis of sales, and ideally a citation index for standards and a merging of standards from different countries on the same subject, to make possible analytical reviews.

The ultimate application of an existing standard, be it voluntary or mandatory, rests with the individual. His following or not following of a standard determines the factual standardization or destandardization. He may be influenced by such factors as:

- lack of time, energy and money on the part of the individual to find out whether a pertinent standard exists and to obtain the standard. The time, energy and money required should be weighed against the individual's possibilities for designing his own specification or house standard (see section 6.5.1).
- the individual may benefit from the best thinking of more qualified colleagues and routinely apply a standard decided once and for all.
- the individual's own solution may not encounter a competing national standard of his own country, nor an international standard, but several national standards from other countries with diverging specifications. The individual then may not know which one to choose and therefore he may make and follow his own design.
- application of a standard may mean costly changes in his operations.
- tradition, like habit, works in favour of the application of existing practices. If these practices are not standardized, then tradition will be a barrier to standardization. If the existing practices are standardized at any level (individual, company, industry, national, regional, international; see Verman 1973), tradition will work in favour of the application of the existing standards, but may work against any revision thereof, including revisions required for standardization at a higher level. In general, standards at a lower level having developed into personal habits or local tradition may be a barrier to standardization at a higher level. This is even more so when vested interests are attached to the established standard. When the individual happens to be an established manufacturer of a product together with the regular supplies that the product requires for operation or maintenance, he may deliberately deviate from a general standard in order to bind his old customers to his product and supplies by making it difficult for them to interchange with products and supplies from other manufacturers.
- sub-standard capabilities of an individual or a group may be the reason for making an easier standard at lower level rather than following a more difficult standard at higher level. When capabilities improve, the more difficult standard may be followed.

- short-range versus long-range and individual versus collective costs or interests: the individual may follow his own design rather than the standard because he expects his individual short-range cost will be lower this way. Another individual in the same case might follow the standard because he expects that the communities long-range interests will be better served. The second individual follows what L.C. Verman (1973) calls a basic principle of standardization: "to work and think collectively and cooperatively".
- what the standard specifies may, in the eyes of the individual, be superior or inferior to what he may be able to create himself. Some individuals show a tendency to rate highly their own creations against standardized solutions of others.
- a third party (other than the individual himself and the issuing body of the standard) may influence the individual by his power, status, authority or money to comply to the standard. A customer ordering a product may demand compliance to the standard, at the penalty of not placing the order. A teacher of construction engineering may demand from his students the application of construction standards in their work at the penalty of a low grade. The third party may be the law or the public opinion, supporting the standard (directly, rather than supporting the standards body).
- the status of the authority issuing the standard may influence the individual to follow the standard. An engineer in industry may use a standard without much attention to its contents, because the standard shows the vignettes of the branch organization and the national standards body.

1.7 STANDARDS AND LAWS

Standards may be voluntary or may have been made mandatory by law. The law may make an existing standard binding or may give the authority to issue binding standards to an institute. Standards may be the objects of agreements voluntarily entered into by parties who, from then on, are bound by law to the agreement and therefore must comply to the standards. The contents of laws, not referring to standards or institutes issuing standards, may still be standardizing in nature. These standardizing laws may be national or may have come into being by ratification of international conventions.

The unification of different voluntary national standards from different countries does not imply the unification of the laws making them mandatory. The voluntary standards may be more uniform than the corresponding laws. The laws must take into account the immediate applicability (Dutch: toepasbaarheid), in view of the penalization of deviations. Standards need not necessarily take into account the immediate applicability but may indicate a point to be striven for. Until they have been realized, standards may, so to speak, be the direction indicators for planning activities. As soon as they are realizable and realized they become a milestone reached in progress. Sometimes the milestone is also the end of the journey. Sometimes, however, changes in environment necessitate a revision of the standard.

Even in an ideal situation, where all national development plans of all countries have been realized, standards may differ from country to country because of the varying factual

situation (including climate, geographical situation, etc.) and because of varying cultural values and political choices. To these differences in the standards should be added the differences due to the not-yet-ideal or far-from-ideal situation prevailing in most countries which are in different stages of development and at varying distances from their ideal.

Differences in immediate applicability related to different stages of development may be a compelling reason to differentiate standards made mandatory by law, but are no compelling reason to differentiate voluntary standards. Nevertheless contrary differences in climate or geographical situation and differences in cultural values and political choices, constitute reasons to differentiate voluntary standards (as well as for varying standards made mandatory by law) and will continue to do so as long as these differences continue to exist. Therefore voluntary standards often cannot become entirely uniform. But while they remain different and non-uniform, they may be less different and more nearly uniform than the standards made mandatory by law. To approach the optimal uniformity of standards and the optimal uniformity of laws it is required to uncouple the drafting of standards and laws, particularly of international standards and harmonized laws. In other words: while attempting to reach agreement on a common standard it may be deleterious to use on the draft standard expressions which imply a binding nature of the document (like in Dutch: Voorschrift).

For the accessibility of laws related to standards, see section 6.6.2.2.

1.8 CHARACTERISTICS OF INFORMATION SYSTEMS

Information systems may be described in terms of characteristics which, when significant in the environment of the systems, may be used as criteria for an evaluation and comparison of different systems. Ideally the characteristics would be independent of each other, but this need not necessarily be the case to make them usable. Ideally an evaluation should be based on both qualitative and quantitative observation of the systems in operation. In the absence of quantitative measurements, a merely qualitative discussion of the characteristics may still give appreciable insight in the relative value of the systems. This insight need not necessarily be entirely conclusive for the success of failure of the systems in reality, as long as some characteristics reflect potentialities which may or may not be realized. The realization may depend on such factors as international political support and the recognition or lack of recognition, that an information system does not contribute to the vital functions of the parent organization.

Known characteristics of information systems include the following:

1 - Reliability: The probability, as percentage, that the system responds as planned, at the time needed, may be called the reliability.

Note: The information systems for the international accessibility of standards take the

technical content of the standards for granted. No indication is given of the technical soundness or reliability of the standard.

2 - Accuracy: The percentage of correct characters in the output of the system may be called the accuracy. Against the accuracy of the system are counted all types of errors in the output: those already originating in the input and those originating in the system. Errors in input may be simply incorrect, or they may just be out of date (i.e. previously correct, but no longer applicable). Errors originated in the system may be due to machines, programmes or operators. Features of a system which help to focus on and correct errors presented to it in the observations put in, will affect the characteristic called "accuracy".

Note: The information systems take the technical accuracy of the standards for granted as long as the standards have been retrieved accurately by the systems. Like systems, standards may be inaccurate for several reasons, for example since they are out of date and no longer applicable, although previously correct. When countries at highly different levels of technical development participate in an information system for the international accessibility of standards, it must be kept in mind that standards accurately expressing the stage of technical development in one country may appear obsolete in another. Accuracy of standards is relative, i.e. connected to the stage of development. Different standards will be required for different countries as long as stages of technical development will differ. See section 1.6.

3 - Maintainability: The capacibility of an information system to absorb changes in programming and techniques without major reconstruction may be called maintainability. Changes in programming may be due, inter alia, to changes in record format or lay-out and changes in codes. Changes in techniques may be due to newly-available equipment better suited to do what was planned. Maintainability makes it possible to continue doing what was planned. Flexibility makes it possible to do things not planned.

4 - Flexibility: The capability of an information system to absorb unplanned changes in contents and presentation of input (i.e. in observations of a changing environment) without major redesign or reconstruction (which would mean designing a new system) may be called flexibility. The changes in the environment may be those originating within the parent organization which the information system serves or those originating outside the parent organization. Flexibility as well as maintainability may be improved by modular design. Flexibility is not independant of other characteristics. For example: reserving in a bibliographic record a fixed field of initially unused positions to absorb possible future changes in demand for elements of information, will not only increase the flexi-

bility of the system, but will also increase the volume (by a fixed number of blank positions) and most likely will increase the life-span of the system.

5 - Life-span (Dutch: levensduur): Life-span may relate to the demand for information or to the solution used to satisfy the demand. When a system is terminated due to changing demands, its life-span is no measure for the adequacy of the operations. When the demand changes, the solution offered may become obsolete and a system operating adequately may be terminated due to changing demands. The life-span of the system in that case reflects the continuity of the information demand. On the other hand, when the demand for information is stable, a system may still be terminated for reasons of inadequacy and necessary reconstruction. In this dissertation the term life-span will be used in relation to the solution rather than to the demand: Life-span is the period of time between first start and final termination of operations. However, changes in the demand may play their part also and termination of operations may be due to changing demands or to necessary reconstruction. The construction and salvage periods are not counted in the life-span.

6 - Response time: the time period between the coming into existence of an information need (not yet necessarily having resulted in the formulation of a question to the system) and the delivery of the needed information, may be called response time. The input-output time or throughput time is a part only of this response time. Whether a response time is acceptable or needs to be decreased depends on the user's requirements. When information is supplied before the need for it arises, the response time will be considered zero (rather than negative).

7 - Volume: The number of characters in storage may be called the volume.

8 - Traffic and traffic density: The number of characters of input and output per unit of time may be called the traffic of input and output. The actual traffic presented to the system as a fraction of the traffic capacity of the system may be called the traffic density. During peak loads the traffic presented may be higher than the capacity of the system, causing delay in the delivery of messages. These delays may temporarily increase the response time.

9 - Construction period: Strictly the construction period is not an operational characteristic, since it ends before the operations start. The construction period is nevertheless an important characteristic of system design, particularly when the environment or the demands change quickly or in many respects. If the construction period is long, the environment or the demands may have changed to require reconstruction even before the operations have started.

10 - The costs may be divided in construction costs, which are substantially fixed by the time the operations start, and the running costs which are variable and extend over the

operational life-span of the system. If desired, the construction costs may be written off during the first years of operation.

When a manual information system is automated (by mechanization and self-regulation), the above-mentioned characteristics may be affected, in general as follows:

1 - reliability decreases: manual systems are more reliable thanks to the dedication and devotion of the people.

2 - accuracy may considerably improve due to the fact that computers and computer operators make very few mistakes, provided the programmes contain no mistakes.

3/4- maintainability and flexibility decrease since computers are programmed according to strict rules, while manual work follows flexible rules leaving freedom to people for creative deviations.

5 - the life-span may decrease since changes requiring reconstruction of a strictly programmed system might have been absorbed in the large non-programmed part of a manual system.

6 - response time may become shorter or longer. The processing time may become shorter, but he processing time may be only a small fraction of the response time. If processing by computer is done periodically, where manual processing was done when required, the response time may become longer.

7 - storage possibilities become more limited: volumes up to about 10^{10} characters may be stored. A magnetic tape may contain about 10^{8} characters, a magnetic disc about 10^{9} characters.

8 - traffic possibilities improve.

9 - construction periods are usually longer for the automated system, if no previous automated system existed, since many details need exhaustive analysis before error-free automated operations may start, while in the manual system with a less detailed programme, the same details need not necessarily be analyzed exhaustively before operations start, leaving their proper handling to the creative manual worker, while operations proceed.

10 - costs are of the same order of magnitude, with large variations due to local circumstances.

CHAPTER 2

EXCHANGE OF INDEX CARDS FOR STANDARDS

2.1 HISTORY 1948 - 1971

In the year 1948, upon the initiative of the Scandinavian Member Bodies, the Council of the International Organization for Standardization (ISO) asked the Member Bodies

- to include UDC numbers on their standards
- to send to the General Secretariat copies of each new standard published
- to send to the General Secretariat "card indexes" of these standards bearing the titles, UDC numbers and short summaries in one of the three ISO languages (English, French, Russian).

In 1950, in order to improve this operation, the ISO Council decided to set up the Committee for Index Cards for Standards (CICS) "to draft an index card for standards, issued by the ISO Member Bodies and to draft directives for the use of such cards". The CICS submitted progress reports and proposals to the Council in the years 1951, 1953, 1954 and 1955, each time obtaining approval to proceed with the study. While giving the approval, the Council decided in 1959 that the current exchange of index cards should continue and in 1955 "recommended pursuing the present exchange of cards and invited other Member Bodies to adopt this system". "Other Member Bodies" were apparently meant to indicate the Member Bodies not yet participating in the exchange of index cards.

The CICS study was not limited to the drafting of index cards and the directives for their use. During the study of the CICS the following matters received attention:

A - the necessity of giving the same UDC numbers to all standards dealing with the same subject. To promote the necessary uniformity and to eliminate the observed inconsistencies in the UDC numbering the following measures were studied, the first of which was actually carried out:
  - issuance of a list of preferred UDC numbers to be used by classifyers of standards and by outsiders requiring reasonable approach (read: access) to standardization material
  - centralized classification and distribution of index cards of all national standards and international recommendations

  ISO/Council Document 14.1.1 - 1954).

B - the possibility to publish a centrally prepared card system of national standards and other publications in the field of standardization (suggestion by O. Frank).

C - in the beginning index cards were to be made for adopted standards, later for draft standards.

D - the need for all standards in a particular subject field by the technical standardization committees in that field. If the exchange of index cards were regularly established, the national technical standardization committees would have at their disposal the complete international documentation concerning standardization in the special fields which are the object of their activity.

E - the desirability and long-run possibility of issuing an ISO yearbook of standards or a kind of handbook being a combination of existing catalogues of national standards and ISO Recommendations (recommended by F. Donker Duyvis).

In 1955 the CICS submitted to the Council two reports:
- Rules concerning index cards for standards (Annex to ISO/Council Document 1957-13, published in March 1957 and revised in March 1959 and modified and published in July 1960) (See Annex 1).
- Rules for allocating UDC numbers to standards and for compiling catalogues of standards; including an abridged UDC schedule (Annex to ISO/Council Document 1957-13 published in March 1957). (See Annex 1).

The Council recommended all Member Bodies "to make use of the rules drafted by the CICS when preparing their standards index cards and to distribute those cards on the conditions laid down by the CICS" (ISO/Council Resolution 1957/31) and "urgently recommended to the Member Bodies to participate in the exchange system of their national standards index cards" (ISO/Council Resolution 1957/32). The contents of the rules concerning index cards will be discussed separately in section 2.2. The "Rules for assigning UDC numbers to standards for compiling catalogues of standards" were noted by the Council and the Council recommended to all Member Bodies

- to make use of these rules for their standards and catalogues of standards
- to publish these rules in their own languages with the abridged UDC schedule and to distribute these documents to other Member Bodies
- to make use of the abridged UDC schedule when preparing their standards index cards (ISO/Council Resolution 1957/31).

The rules for compiling catalogues of standards recommended that catalogues will consist of two or three parts:
A - a classified list according to the abridged UDC schedule
B - an alphabetical index of principle (title) words
C - a systematic list arranged in accordance with the system used by the national member body, for which, however, UDC is recommended, which would make this part C identical to part A.

In short: a UDC sequence containing all elements of information is recommended, supplemented by an alphabetical index of principle (title) words.

When the"Rules concerning index cards for standards" were applied, the need for a revision based on actual practice soon became apparent and, after discussing a proposal for revision from the General Secretariat with experts from Member Bodies on 17 September 1958, the CICS submitted revised rules governing index cards for standards (Annex to ISO/Council Document 1959-14, March 1959) to the Council, which adopted the revised rules and again urged Member Bodies not yet participating in the system of exchange of index cards to do so as soon as possible (ISO/Council Resolution 1959/20). In 1960 the Council modified the revised rules (ISO/Council Resolution 1960/8). The contents of the revised and modified rules will be discussed separately in section 2.2 and shown in Annex 1.

In 1961 F. Donker Duyvis, chairman of the CICS, died.

In 1962 the Council decided to disband the CICS and to entrust

to the General Secretariat the current work in connection with the setting-up and the exchange of index cards (ISO/ Council Resolution 1962/28). It may be supposed that shortly thereafter the Netherlands Member Body discontinued its participation in the exchange of index cards.
In 1966 the Council decided that the system of exchanging index cards on national standards should continue until the Secretary-General had thoroughly studied the question of improving the operation and of meeting the expenses involved (ISO/Council Resolution 1966/46).
In 1969 H. Wellisch published proposals for improvement, including centralized classification, electronic data processing and modern reprographic methods (see sections 2.3.6 and 4.2).
In 1971 the Council advised Member Bodies to terminate the exchange of index cards since the system had in fact been largely abandoned by Member Bodies, presumably because of the workload involved, and because the automated system being developed was replacing the index cards (ISO/Council Document 1971 - 10.2/1).

Since de facto abandonment was a reason for its termination in 1971, a review of the extent of its implementation is pertinent. In 1959 the CICS reported the system to be "in partial operation. The General Secretariat itself receives regularly the index cards set up by twelve Member Bodies; the index cards from four other Member Bodies reach it from time to time or in insufficient numbers" (ISO/Council Document 1959 - 14). N.A.J. Voorhoeve reports in 1961 and 1964 that 19 Member Bodies and the General Secretariat of the ISO participate in this system of international exchange. The Netherlands participated until about 1962. At least the following countries are known to have participated at one time or other (in order of UDC): Great Britain, Czecho-slovakia, Spain, Portugal, Russia, Finland, Norway, Netherlands, Belgium. Switzerland, Greece, Rumania, Japan and the U.S.A. The ISO General Secretariat also participated.

2.2 RULES AND RECOMMENDATIONS CONCERNING INDEX CARDS FOR STANDARDS

Rules and recommendations concerning index cards for standards were originally published in March 1957, revised and published in March 1959 and modified and published on 17 July 1960. The rules, as prevailing after the modification in 1960, are construed from the revision document (ISO/Council Document 1959 - 14) and the modifying resolution (ISO/ Council Resolution 1960/8) in Annex 1. Cards from actual usage are illustrated in Annex 2. The following 8 points may be noted.

2.2.1 Purpose and goal

The purpose is to facilitate the use and the coordination of the large number of standards issued by the national standards bodies. The goal is to cover all existing standards of national standards bodies.

2.2.2 Standards and cards

For each standard a set of index cards should be prepared by the national standards body. The exchange of index cards will take place along with the exchange of standards already in operation between national standards bodies.

2.2.3 Countries, standards bodies and issuing bodies

The rules require each of the following three elements of information:
- UDC number for issuing country (UDC auxiliary of place)
- letter symbol for standards body
- the name of the issuing body

See also section 2.3.1

2.2.4 Universal Decimal Classification (UDC)

The rules require at least one UDC number for each standard, possibly 2, 3, or 4. To facilitate the designation of UDC numbers to standards, an abridged UDC schedule for classifying standards was available, as well as an alphabetical index to the abridged schedule and a key to the UDC auxiliaries of place (country codes). The draft of the abridged schedule was edited by N.A.J. Voorhoeve and published later, in 1963. A trilingual abridged UDC edition, not specifically for standards, was made by DNA, BSI, ABD and UFOD in 1958 (FID publication No 277). The classification according to UDC is decentralized: each standards body classifies its own standards.

2.2.5 Keywords

Keywords in the titles are underlined in the original title as well as in the titles translated into English or French.

2.2.6 Each standards body its own serial

The index cards are given a serial number by the standards body preparing the card. Each standards body has its own serial running through the years. The year in which the card is prepared is added.

2.2.7 Sequences and number of cards required

The following sequences are mentioned or implied in the rules:
1 - numerical sequence according to UDC
2 - numerical sequence according to UDC auxiliary of place (country code) followed by the serial number of the card
3 - alphabetical sequence, presumably according to title
4 - alphanumerical sequence according to UDC auxiliary of place (country code) followed by the reference (number or letter/number combination) of the standard corresponding with the card.

Sequence 1 requires an alphabetical index to the abridged UDC schedule for classifying standards. Sequence 2 and 4 require a key to the UDC auxiliaries of place (country codes). This latter key should in principle also be alphabetical, but due to the small number of codes involved and thanks to the geographical arrangement of the key, a numerical key can be used. As mentioned in section 2.2.4 the index and the key were

available (N.A.J. Voorhoeve 1963). The intended filing sequences determine the number of copies required in each set of a particular index card to be distributed to each participant. Both the revision of the rules in 1959 and the modification in 1960 mainly concern the number of copies of each index card to be included in a set. The original rules require three copies (including the original) for every UDC number on a particular card. The revised rules require as many copies as UDC numbers on the card, plus one. The modified rules require as many copies as UDC numbers on the card, plus two.

2.2.8 Translations

Translation of the title, presumably by the body preparing the index card, into English, French or Russian is required when the original language is not one of these. If it is one of these, translation into one of the two others is recommended. In any case English or French are required. The index card provides space for the translation of the title by the receiver into his own language.

2.2.9 Related standards

The rules require the registration of a standard, if any, from which the indexed standard has been derived by adaptation. Further space is available for optional reference to other related standards or similar documents, such as corresponding ISO publications and corresponding national standards. The optionals are to be filled in by the receiver of the cards.

2.2.10 Revision and withdrawal of standards

When a standard is replaced, the card is replaced by another card. The replacing card keeps the original serial number of the card replaced, with the years of both the original and replacement written behind it. When a standard is withdrawn, the card is withdrawn from the UDC file (of section 2.2.7 sub 1 (presumably all copies)), but is retained in the country files (of section 2.2.7, presumably both sub 2 and sub 4). Cards may also be replaced for other reasons than revision or withdrawal of the standard. (See section 2.3.8).

2.3 MATTERS NOT PROVIDED BY THE CICS SYSTEM FOR THE EXCHANGE OF INDEX CARDS

While the previous section 2.2 summarizes the matters provided by the CICS system for the exchange of index cards for standards, the present section will note matters not provided. Among these matters not provided will be found some which were included in the scope, but not realized; some which were outside the scope although they could have been included; and some which could not reasonably be expected to be included in any scope defined at the time the CICS designed its system (about the year 1950). The present author wishes to stipulate at this point that he considers the activities of the CICS as pioneering work of high quality and the system in its peak years of operation as the most comprehensive actual result which has so far been reached in the international documentation of standards. The following sections may not detract

from this opinion.

2.3.1 Goal and field of coverage

The goal being to cover all existing standards issued by national standards bodies, this
- would seem to include standards issued by all national standards bodies, members and non-members of the ISO. However, no attempt (other than the attempts to make them members) is known to the writer to make national standards bodies, non-members of the ISO, participate in the exchange
- would seem to exclude standards issued by organizations of national scope, other than national standards bodies. However, when accepted by a national standards body, these standards were included. For example: ASTM standards accepted by ASA
- will exclude standards issued by international organizations other than the ISO, such as the FAO, IEC, ILO, ITU and WHO.

In the actual operation ISO Recommendations were included. IEC Recommendations were not. Neither were standards or recommendations from FAO, ILO, ITU or WHO.

To sum up: Neither the goal nor the actual operation was comprehensive in its coverage of standards.

In view of this coverage the requirement (see section 2.2.3) to write on the cards the issuing country (UDC auxiliary of place) and the standards body (letter symbol) and the name of the issuing body deserves attention. These three elements of information together give the possibility to include standards of all organizational levels in the system without danger of confusion in the designation codes. For a more limited operation between ISO Member Bodies the inclusion of the elements country and issuing body would seem superfluous.

2.3.2 The index cards and alternative sources of information

The card index system was set up and used as a complement to the following existing sources of information on standards:
- the standards themselves
- standards catalogues
- standardization periodicals
- acquisition lists of foreign standards issued by certain standards libraries
- compilations made by branch organizations

The collection of national standards catalogues and/or standardization periodicals were in the possession of each standards body due to the international exchange between those bodies. They were similarly obtainable by any party willing to order the catalogues and periodicals. The acquisition lists of foreign standards from certain libraries were available on request and so were the compilations made by branch organizations.

In the "Rules for compiling catalogues of standards" the CICS recommended, inter alia, the catalogues of standards to contain a UDC classified list in which every standard is included under broad UDC subject headings as given in the abrid-

ged schedule of the UDC. And in 1959 the CICS writes: "A consultation of the card index file enabled the standards of the different countries bearing on the same subject matter to be picked out, which would not have been possible by consulting all the standards catalogues contained in the library, especially because of the ignorance of certain languages" (ISO/Council Document 1959-14).Donker Duyvis recommended the combination of existing catalogues of national standards and ISO Recommendations from the index card file, presumably in order of UDC. It must be noted, however, that in the actual operation no such combined catalogue, merging existing catalogues, was published from the card index.

The exchange of index cards did not in actual practice replace or make unnecessary the exchange of any of the already existing alternative sources of information (standards, catalogues, periodicals, acquisition lists, branch organizations). In principle it could have replaced the national catalogues and acquisition lists. The ideas for disseminating the information from the index card files as catalogues in bookform accessible to users anywhere were not worked out or followed up. The exchange of the index cards brought new work to the information and documentation sections of the standards bodies, without simultaneously reducing work for them. Applying hindsight, one may even wonder whether the CICS system might have been more successful and more lasting if the index cards had been mailed by issuing bodies to one central place only (instead of to all participants), for storage of the cards and printing in bookform and mailing as uniform international catalogue supplementary to the national catalogues. (See also section 2.3.11.2)

2.3.3 Keywords

The keywords are underlined in the titles and translated titles. Keywords not from the titles are not mentioned. Asking ourselves what particular use of the underlined keywords was foreseen, our attention is attracted by a statement of the CICS in "Rules for compiling catalogues of standards" (ISO/Council Document 1957-13) that catalogues of standards should contain "an alphabetical index of the principle (title) entry words in which for every standard or group of standards the relevant designations as well as the page number(s) or UDC number(s) are given, thus facilitating reference to the systematic list". One looks in vain, however, for a specific recommendation to file the index cards alphabetically according to keywords in one or more languages, or to make an alphabetical index of the keywords underlined on the cards which could refer the reader from the keyword to the index card (serial number) or to the standard (designation or reference).

In 1969 Wellisch, in his proposal for an international centre of standards documentation, takes up this question of keywords. He proposes the publication by the centre of the UDC tables preferred by the centre and of the polyglot technical and scientific glossaries of terms taken from titles of standards.

2.3.4 Technical committees and sequences

The index cards do not show the technical standardization committees which conceive and draft the standards as collective authors. The names or numbers of the technical committees have no place under the rules for the cards. This omission is surprising in the light of article 2.2.4 of the ISO Constitution which as a means to the stated object of ISO indicated, inter alia, that it may "arrange for exchange of information regarding works of its Member Bodies and of its Technical Committees". In other words: the vital functions of ISO are involved. If the technical committees had been included on the index cards, a numerical and/or alphabetical sequence of the cards according to technical committee name or number would have been possible. This sequence could have been included in a catalogue in bookform, provided a technical committee index for different countries be added. Omitting the technical committees from the cards means blocking one entry giving access to standards. The users handicapped by this omission are those whose main contact with standardization is through members of national or international technical standardization committees. Since the connections between the national and international technical committees as to membership and subject matter could be shown in a simple way by elaborating existing documents, such as "Participation in Technical Committees" by the ISO, the omission of the technical committees from the cards means that a possible road of international access to standards is not being opened by the CICS system (see also section 3.2.1). Thereby this road remains restricted to the informal personal use by the committee members themselves, unaided by a formal system. This chance to serve the vital functions of the parent organization is missed.

2.3.5 Translation

The ISO Council Resolution 1959/21 emphasizing the desirability that standards published in other than an official language of the ISO (English, French and Russian) shall also bear a translation of the title in one of the ISO languages, and the rules of the CICS for the exchange of index cards for standards, requiring that in any case the titles should be given in English or French on the cards, were both intended to improve the international accessibility of standards and may have had the intended effect to some extent. At the same time, by limiting the translation requirements to languages other than English, French or Russian and to languages other than English or French respectively, they may in fact have discouraged the inclusion of translations of titles of standards originally in one of these three languages, even though this was among the recommendations.

By not requiring English or French speaking countries to add any translation to their titles at all, the CICS system treats different language groups more unequally than is necessary. The selection of three (ISO) languages and of two (CICS) languages as official, places a burden on the other language groups. A more nearly equal division of burdens would have been obtained by selecting one official language from artificial or non-living languages such as Esperanto or Latin. Against the selection of one such language as official language it may be argued that the total burden, while more equ-

ally divided, would be much heavier. Accepting therefore the selection by the ISO of three living languages as official, and the selection of two living languages by the CICS as working languages, emphasis should be placed on the necessity to mitigate wherever possible the unequal burden placed on the other language groups. A possibility to mitigate would have been the requirement that English- and French-speaking countries, like the others, add one translation to the titles of their standards. Besides making the burdens less unequal, this requirement would have served the additional purpose of making standards written in the official or working languages more accessible to other language groups. A recipient in The Netherlands of a standard in the French language may be relieved to read the English translation of the title. A recipient in Rumania of a standard in the English language may be delighted to read the French translation of the title. Etc. The apparent redundancy of showing the title in two working languages is useful in avoiding inaccuracies in interpretation. The requirement by the CICS that the title should be shown in English or French, irrespective of the original language of the standard, is too narrow. This is particularly so in the decentralized mode of operation practiced in the CICS system, where every participating member classifies its own standards using an abridged UDC schedule made especially for classifying standards, but available only in the same working languages plus German.

The problem observed here in connection with the accessibility across language groups of index cards for standards, is a part of the much broader problem of using an existing natural language, for example English, as information language for mixed language groups, including both the original language group and foreign language groups. This general problem has recently been dealt with by H. Wellisch (1973).

To do justice to the CICS rules, it must be said that these rules do not forbid the inclusion of a translation of a title on standards originally in the English or French language. They even recommend it, but they just do not require it.

Simple rules concerning the languages to be used, serving approved accessibility of standards, and more equally distributing the burdens and benefits, would have been conceivable. For example each of the following three alternatives:

Each title is shown in two or more languages, at least one of which is
- English. For countries having English as national language, three languages are required: the three official ISO languages English, French and Russian
- English or French. For countries having English or French as national language, three languages are required: the three official ISO languages English, French and Russian
- an official ISO language. For countries having English, French or Russian as national language, three languages are required: the three official ISO languages English, French and Russian.

Stating that more equitable rules for adding translations

of titles to standards may be written than the CICS rules here criticized, does not mean to say that making a translation of the title of a standard is necessarily required to make the standard accessible. This may be done also by adding UDC numbers from a multilingual abridged schedule, as the CICS propagated (see section 2.2.4), or by adding numeric descriptors from a multilingual controlled vocabulary (see section 4.5).

In the CICS system keywords, titles and standards may be translated from one particular language into another particular language more than once, the later translator not knowing of the earlier translation. The card index does not attempt to register the languages, original or translated, wherein the standard is available. A user in need of a particular standard in a particular language of his choice, cannot generally tell from the index whether that standard is available in that language. Of course it must be noted that the index card system is by no means the only conceivable source of information on translated titles or the presence somewhere of translations of standards. Other possible sources include the standards catalogues and translation indexes. The DNA issues a separate volume "English translations of German standards", containing a subject-index arranged in groups based on UDC, and a numerical list.

In the CICS exchange system, original titles may be found at least in Latin, Greek, Cyrillic and Japanese characters (see illustration in Annex 2). No rules are given for the use or transliteration of different alphabets. ISO standards on transliteration are the following: ISO/R 9 (Slavic Cyrillic, see also GOST 16876-71), ISO/R 233 (Arabic), ISO/R 259 (Hebrew) and ISO/R 843 (Greek), all transliterating into and/or from Latin characters.

2.3.6 Universal Decimal Classification (UDC)

The UDC is used in the card index to make unnecessary a translation of the titles and standards searched but not pertinent. The UDC is available in very many languages and for the purpose of classifying standards the CICS published the trilingual abridged schedule. As mentioned in section 2.1 the ISO Council recommended its members to translate the abridged UDC schedule in their own languages and to use the translated schedule when preparing the index cards. The CICS repeatedly insisted on the necessity to assign the UDC numbers in a uniform manner, preferably by one responsible classifier in a central operation. Neither the centralized classification nor the uniformity in the UDC numbers was realized in actual practice. As late as 1969 H. Wellisch, when proposing an international centre for standards documentation, again, in a painstaking analysis, observes that in practice the same subject is often expressed by a bewildering variety of UDC numbers of varying specificity, complexity and exactness. He notes no attempt has been made to use the CICS system as the basis for a subject concordance to the worlds standards. The first task he proposes for the international centre is the central control of classification of standards, in order to achieve UDC numbers standardized as to conceptual connotation, specificity, relation to other concepts and use of auxiliary numbers. He advocates its use as a meta-language for concepts expres-

sed by a multitude of terms in different languages.

2.3.7 Related standards

A standard may have been derived from another standard. Let us call the first mentioned standard the "son" of the second, the "father". The index card of the son cites the reference or designation of the father, as required by the rules. The index card of the father does not usually cite the reference or designation of the son. No provision is made to invert the son-father citation by making a father-son citation index. This index could have been made by filing the index cards alphanumerically according to the reference of the father.

More generally, a standard may cite several related standards or recommendations. Apart of the father-standard required by the rules, the index card provides space for corresponding national standards and international recommendations. Again there is no citation index inverting the relation referring-referred to the relation referred-referring.

As is well known, the general principle of the citation index is applied on a large scale by the Institute of Scientific Information (ISI) in their Science Citation Index, reportedly one of the earliest applications of computers in the field of documentation (Cawkell 1968, cited by C.Groeneveld 1971). A citation index inverting the relation "(draft) standard referring - (draft) standard referred to " to the relation "(draft) standard referred to - (draft) standard referring" is a desirable searching tool for a standardizer studying the formulation or revision of standards.

2.3.8 Changes

No indication was given in the rules as to what change in the elements of information given on the index cards was sufficient to necessitate a replacement of the card. What change in the standard necessitates a replacement of the card? Were corrections to be treated as replacements? Was a change in the price of the standard sufficient to replace the card? Was the year of the replacement to be indicated in these cases like in the case of replacement due to revision of the standard? Presumably these questions were left to the judgement of the standards body issuing the standard and the card. On these details the accuracy of the system must have been poor.

2.3.9 Uniformity of format and flexibility

While the rules specify several dimensions of the cards, the cards were not preprinted in a central location which could have guaranteed their physical uniformity (See illustration in Annex 2). The rules set no limitation to the number of positions available for each element of information, and the flexibility for changes in an element of information was great.

It may be noted that the standards themselves, from different countries, also showed little uniformity either in elements of information contained or in layout.

2.3.10 Mechanization

The manual CICS system had very good maintainability. As to the desirability of mechanizing the operation in order to reduce manual work, two authors are in agreement. Voorhoeve indicated this desirability in 1961 and 1964. Wellisch in 1969 recommended the use of punched cards which could be read by both man and machine. The CICS system did not provide or indicate mechanical means for storage and retrieval of the index cards. Largely the same file is kept manually in as many different locations as there are participants in the exchange. Voorhoeve raised the question whether the introduction of mechanical methods at one central place for providing up to date and quick information on standards would be feasible.At that time (1960 - 1964) the suitability of the UDC for automatic retrieval had not yet been firmly established. Reports with that conclusion are of later date. In 1967 Freeman and Atherton concluded: "First and most obvious, there is no longer any doubt that the UDC can be used as the indexing language in a mechanized system." And: "Our second conclusion, then, is that the UDC, as it presently exists, probably cannot function as efficiently in a mechanized system as an indexing language designed specifically for machine processing, but no barriers exist to the succesful use of the UDC in either a batch processing or interactive mode."
The desirability to mechanize the manual work in areas where machines are cheaper than labour may be subscribed to, to the extent that processed information is obtainable only by machine, or is obtainable speedily and timely only by machine; although the maintainability of a mechanical system would be less than that of a manual system. The lack of mechanization by itself cannot be considered to have been a serious obstacle in the international exchange of the index cards for standards. On the contrary, any introduction of mechanization in this field should take extreme care that it does not become an obstacle to those standards bodies (a majority of ISO Member Bodies) not having mechanical means available.

2.3.11 Review

2.3.11.1 Review in the light of the international distribution of catalogue cards in general

The ISO/CICS cards for standards may be reviewed in the light of catalogue cards in general. "International distribution of catalogue cards" by R.S. Giljarevskij, published in 1969, reports the results of a survey sent out in December 1965 to 120 addresses (libraries etc.) in 32 countries inquiring about the use of catalogue cards. The survey shows that catalogue cards are used in most countries. Main uses of the cards as indicated by the survey are

- for centralized cataloguing
- for information about new books
- for bibliographical card indexes used for reference work

One country, the USSR, specifically reports their use for State standards. In most countries distribution is national and very few are distributed abroad. Giljarevskij believes that the two main obstacles to their international distribution are

- the lack of uniformity in cataloguing usage and biblio-

graphic description, including the entry heading which governs the card's alphabetical position
- the length of time between acquiring a book and the issue of its catalogue card.

He looks into the possibility that analyzing the content with a view to classification causes difficulty, but observes that class marks based on internationally-recognized classification systems (UDC or Dewey) are usually shown on the cards, which class marks are interchangeable and can easily be understood in another country, and consequently cause no real obstacle. Giljarevskij concludes that the main obstacle is the lack of uniformity in the rules for bibliographical descriptions (to be overcome by international standardization of the rules for bibliographical description) and the fact that cards prepared separately from books hardly ever reach libraries at the same time as the books (to be overcome by placing in every copy of the book a standardized catalogue card, including bibliographical description, class marks and subject headings, prepared from an advanced copy at the same time as the book to which it refers by a library or bibliographical centre having staff qualified for the job and the necessary catalogues).

The above constitutes a - paraphrased - review of Giljarevskij's findings on the international distribution of catalogue cards. What do they mean for the more specific subject of international exchange of index cards on standards?

The international standardization of bibliographic descriptions, lacking in the year 1965 foor books etc. in general, was provided for, for internal use, by the recommendations of the CICS, which recommendations were in fact reasonably followed. This possible obstacle to efficient international exchange of index cards for books etc. in general, was not an obstacle in the exchange of index cards for standards.

The length of time between acquiring a book and the issuance of its error-free catalogue card, considered an obstacle for the international exchange of cards for books etc. in general, has not significantly affected the response time of the CICS system, mainly because the organizations issuing the standards and their index cards were largely the same as the participants in the exchange system. When the suggestion was made that the CICS operation sometime in the future could be extended from standards to draft standards, no hint was made that this extension - for the primary purpose of making draft standards more accessible - could have benefical secondary effects on the accuracy and response time of the existing operation for standards. Benefical effects on the accuracy could have been expected: By requiring that the rules for index cards for standards also be applied to draft standards, the elements of information are added at a much earlier time, making their review and correction possible before the issuance of the standard, so that an error-free index card, including a descriptive title, a standardized UDC number and including keywords if desired, can be added to the standard when issued. Only in rare cases when very late changes in the draft standard are made which affect the data on the card but which are too late to allow timely correction of the cards, may the issuing standard not be accompanied by the card. This measure of including the draft standards would move the pro-

blems to the index cards of the draft standards in the comforting assurance that draft standards are temporary and that their index cards are no more definite than the drafts themselves. While the inclusion of draft standards could thus have improved the accuracy of the data on the standards, it would not have significantly affected the response time for questions on standards. (It would of course have improved the response time for questions on draft standards.)

Lack of uniformity and interchangeability of content-analysis and classification, not considered an obstacle for the international exchange of cards on books etc. in general, certainly was an obstacle to efficient operation in the CICS system. The question is not only one of more or less centralization complemented by less or more standardization of the classification. It also implies the preliminary question of availability of qualified classifiers. In the extreme case that, for financial or other reasons, just one qualified classifier is available, it is clear that both centralization and standardization are guaranteed as long as he himself classifies consistently. This problem is not due to any inherent weakness in the system as such. It is not due to insufficient implementability of the system, but it relates to the actual implementation.

2.3.11.2 General review

In the absence of conspicuous weaknesses in the design of the CICS system and in the absence of unmendable weaknesses in its actual operation, the reason for the operation having remained limited in time and space (from about 1951 until 1971 with a peak of nineteen countries plus the General Secretariat participating) should be sought in the implementation (rather than implementability), in particular of the following points, all recommended by the designers, but not decided or implemented:

A - inclusion of draft standards
B - centralization of the classification
C - the central distribution of information including completed index cards as well as processed information such as a merged catalogue

That good implementability may be accompanied by poor implementation may be illustrated by the supposition that the CICS rules and recommendations prevailing after 1960 had to be construed (as the author did in Annex 1) from the original (1957), the revision (1959) and the modification (1960) since no single updated document was available. Suppose that such an updated document has never existed, this would delay the implementation, or do worse. Good implementability still requires good implementation.

The CICS system was a network wherein each participant communicated in principle with each other participant. In this sense all participants performed a central function. The participation of the General Secretariat meant that it contributed its standards (i.e. international recommendations) as input, but it did not mean that the General Secretariat performed a function in the CICS system which was not also

performed by all other participants. The General Secretariat performed unique central functions in standardization, but these fell outside the scope of the CICS system.

While the hesitation to include draft standards at a time when the operation for standards was less than perfect is understandable, the hesitation to centralize the classification and to distribute centrally processed information is more difficult to understand. The information processed is reference information, not involving copyrights or sales revenue directly, while the distribution could have been controlled by general agreement. Given a preference for organizational decentralization as regards the vital functions of standardization of the international technical committees, integration and partial centralization of information services obeys this preference by facilitating decentralization of these functions.

CHAPTER 3

THE FIRST COMPUTER-MADE CATALOGUE OF NATIONAL AND INTERNATIONAL STANDARDS

3.1 ALTERNATIVE SOURCES OF INFORMATION

As was mentioned in section 2.3.2 the standards catalogues are among five other sources of information on standards:
- the standards themselves
- standardization periodicals
- acquisition lists of foreign standards issued by certain standards libraries
- the international card index for standards
- compilations made by branch organizations

Before dealing with the first largely computer-made catalogue of national and international standards, i.e. the NNI catalogue 1969, we give here a brief review of the situation in the Netherlands as to these alternative sources of information around the year 1969.

3.1.1 The standards themselves

The Netherlands standards were readily available for sale, and orders were generally executed within a day. They were available in many libraries. When stored between standards of other countries, the deviating layout of many Dutch standards was inconvenient. Annex 3 shows the first and last pages of NEN 2391 (1962) as an illustration of the deviating layout with, among other things, the title of the standard printed at the bottom of the page. Among foreign standards the only standards found concurring in this respect were the Danish. For those desiring to make standards more uniform internationally, an international recommendation on the layout of standards was lacking. Nevertheless, it was possible to glance at the layout of the ISO Recommendations and of national standards of other countries and to bring the layout and arrangement of Dutch standards on major points in closer agreement with the majority of standards. This was done by NNI in the year 1969 (NNI. Nederlandse normen in het jaar 1969). The new layout is illustrated in Annex 3 for NEN 2391 (1974).

Dutch standards and draft standards, foreign standards and international recommendations of ISO and IEC could be consulted free of charge at the NNI information centre in Rijswijk Z.H. Foreign standards were lent out for short periods for a nominal charge. Copyrights prohibited the photocopying of foreign standards, de jure but not de facto.

3.1.2 Standardization periodicals

Standardization periodicals from the NNI and from other standards bodies, announcing newly issued standards and draft standards, were available for consultation at the information

centre in Rijswijk Z.H.

3.1.3 Acquisition lists of foreign standards

In 1969 the NNI did not issue a acquisition list of foreign standards received. Acquisition lists of the British Standards Institution (BSI) and the Standards Institution of Israel (SII) were available at NNI.

3.1.4 The international card index for standards

In the year 1969 the NNI did not participate in the international exchange system for index cards for standards designed by the ISO/CICS (See chapter 2). In fact NNI discontinued its participation around the year 1962.

3.1.5 Branch organizations

Some branch organizations compiled information on standards within their particular field (For example CEE, see Vlasman G.W., 1971).

3.2 MANAGEMENT INFORMATION SYSTEM

The present chapter will illustrate one national information system for the accessibility of national and international standards. We have chosen the Dutch system, which was the first to issue a computerized catalogue of standards. It must be emphasized that in 1969 the automation of the NNI catalogue of standards was not an isolated (though isolatable) project. It was a result of the study of the efficiency of the organization. The present author was in charge of this study and of measures taken to improve the efficiency. Even a preliminary investigation showed immediately that information required for many decisions was insufficient and guidance of many activities was consequently hampered. For example it was not definitely known which standardization committees (still) existed and on what draft standards they were working and intending to work. Under these circumstances it was expected that the mere supply of rather elementary information at the proper places would improve the efficiency of the operations and of the organization as a whole, as in fact it largely did. Although the efficiency study went beyond the scope of the present study, the management-information system designed contained certain subsystems which are relevant to a study of the accessibility of standards: committees, planning and forecast, catalogue of standards, invoicing and sales analysis. These subsystems will be reviewed briefly.

3.2.1 Committees

An inventory was made on punched cards of the committees of the NNI with the relevant elements of information, including among others the following:

- name of the committee
- numerical code of the committee; from this code the status of the committee may be known (steering, coordinating, standardizing; subcommittee, working group etc.)
- number of members
- years of foundation and disbandment (if any)

- international standardization committees wherein the Dutch committee participates.

In the process of collecting this information it was necessary to publish an incomplete list in July 1969 for additions and comments (NNI. De Nederlandse commissies van het NNI. 1969). In March 1970 an amended list was published.

The significance - to the accessibility of standards - of making known this information on the technical committees and their international relations has been mentioned in section 2.3.4 and will be mentioned again in section 3.4.2.5.

3.2.2 Planning and forecast

The draft standards on which a committee is working or planning to work in the future were listed for each committee, with an indication of the priority for each standard and with a forecast of its growth through the years. Elements of information include
- numeric code of the committee
- estimated number of pages of the standard
- priority
- forecast growth per quarter of the year;
  this growth is measured by nine successive events which happen, each on a particular day, during the growth of a Dutch standard
- week wherein the forecast was made

The forecast - for the first time in this form - of the production of Dutch standards in the years 1969 through 1972 was published in November 1969 (NNI. Prognose Nederlandse normproductie. 1969) and for the years 1970 through 1973 in May 1970.

The significance of the publication of the planning and forecast of the production of national Dutch standards for the accessibility, national and international, is great: The interested reader may know years before the issuance of a Dutch standard (or months before the adoption of an ISO Recommendation as a Dutch standard) that the standardization committee is working towards the standard and he may note the stage the growth of the standard has reached and the forecast of further growth. Using the committee list of section 3.2.1 he may find the international committees wherein the Dutch committee is participating. This will give him a subject key to international standards being drafted by the ISO, and - at least in principle - to national standards being drafted in other countries. At least in principle, since access to the related standards being drafted in other countries presupposes the availability of a similar publication of the planning and forecast in other countries. It also presupposes an index in order of the international committees, in other words a merged inversion of several national committee lists like the one of section 3.2.1.

For the reporting of advancement of draft ISO Recommendations see section 4.3.

As late as October 1974 P. Lazar et al., writing about standards for information systems, indicate insufficient planning and coordination of, and information on, international standardization are a reason for national and international standardization not to reach the ideal of adjusting harmoniously to each other but to act frequently as factors which rather hinder each other. These authors consider preparing a plan which takes into consideration the present situation and the short-term and long-term priorities as an absolute necessity. They want to include in the plan the subject field to be standardized, the nature of the normative instructions to be elaborated in several phases of the work, the international organizations participating and the time schedules for the different phases of the work.

3.2.3 Catalogue of standards

See section 3.4

3.2.4 Invoicing

The invoicing of standards ordered by customers of different categories, obtaining different rebates, was, prior to 1969, done by hand on a typewriter. In the automated system it was done by machine, applying the different rebates while producing the invoice, and storing the information of the invoice in machine-readable form for later analysis of the sales. Each standard obtained a numerical code. Each regular customer obtained a serial number and a code indicating its status (contributing member, non-member, educational institution, foreign standards body) determining the customers rebate.

3.2.5 Sales analysis

The information stored from the invoices in machine-readable form was usable for analyses of sales (see section 3.5).

3.3 SALES ANALYSIS, BY HAND

The sales of standards by the NNI, acting on its own behalf as to Dutch standards and acting as sales agent for international standards recommendations and standards from other countries, were analysed by taking as a sample the orders reaching the sales department during the week ending on Friday 31 May 1968, and the invoices leaving the sales department that same week. While this analysis was done for several purposes (relating to the efficiency study and the possible automation of invoicing and sales analysis) it will be used in the present context to obtain a rough orientation of the demand for standards across the Dutch borders. The analysis (B.E.Kuiper, NNI. 1968) is abstracted here in view of the present study.

The results of the analysis should be seen in the light of the multilateral agreement between standards bodies to be each other's sales agent and to export standards exclusively through these agencies. This agreement of course does not prevent a customer from ordering abroad through his foreign

affiliate or any other party, possibly in order to speed up the moment of delivery, thereby increasing the apparent home-sales at the expense of apparent export/import sales. Apart from this agreement most standards bodies had foreign standards available in their libraries for consultation on the spot and some lent out foreign standards from their libraries on request to regular customers.

The analysis shows:

- From the 415 orders received in the week ending Friday 31 May 1968, 396 were simple orders for standards from one standards body (national or international) only, and 19 were complex, for standards from more than one standards body. The division of the standards over the bodies was as follows:

standards body, etc.	simple orders	parts of complex orders
ISO	6	2
IEC	1	4
EOCS (Euronorms)	1	0
Netherlands	293	13
France	3	2
Belgium	1	1
Germany	53	13
Italy	1	0
Great Britain	16	5
Sweden	3	0
Austria	2	0
USA	15	3
Israel	1	0
India	0	1
Total	396	44

- the foreign standards were ordered by mail from the proper foreign standards body. The receipt of the standards ordered lasted between 1 and 6 weeks.

- during the same week 116 orders for foreign or international standards from previous weeks became ready for mailing: 78 invoices were mailed to member-organizations of the NNI, 34 to non-members and 4 were mailed to educational institutions in the Netherlands.

- in the same week 307 invoices were sent for deliveries of Dutch standards, including 18 invoices to 10 foreign standards bodies for 58 different standards, representing 65 copies or 299,70 guilders.

The conclusions from this analysis are: Roughly three quarters of the orders in the sample week were for Dutch standards, 23% were for foreign standards and 2% for international standards or recommendations. Roughly 6% of the invoices in the sample week were sent to foreign standards bodies, 10 in number, acting as sales agents for Dutch standards.

From the two conclusions above it would seem conceivable that the international accessibility of standards and its

improvement are of some interest to the customers of the NNI.

3.4 NNI CATALOGUES 1969 and 1970

3.4.1 Motives for automation

The NNI catalogue 1968 was made by hand, like all other published catalogues of national standards bodies of that year. The NNI catalogue seemed no less satisfactory than the other catalogues. Nevertheless there were motives for considering its automation, for example the following three (A, B, and C):

A - Each time a new issue of the catalogue was required, the information on all standards, including the ones which had not changed, had to be manually prepared for printing. (since one page contains many standards). During this tedious work the desire had grown for a method not requiring manual work on standards not changed.

B - Some of the information useful in the catalogue, was also used for other operations. Since these other operations were being automated (see section 3.2 Management information system) it was preferable to derive these elements of information from one source. Examples:
- The catalogue was, inter alia, used as a sales instrument, and the catalogue required information also required for the automated invoicing: item number (bestelnummer), availability for sale (leverbaar), applicability for each standard of rebates for quantity of standards ordered (kwantumkortingen) or for the status of the customer ordering (klantenkortingen), and code of subscription (bestelnummer van het abonnement).
- The catalogue was usable for the technical committees drafting standards, provided certain elements of information were included: the committee code, status of the standard, languages. The catalogue could be instrumental in a system for speedy revisions of standards.
- The catalogue contained many elements of information usable for analysis of standards sold. The sales analyses were being automated, requiring information not only from the invoices, but also from the catalogue. For example: an analysis of standards sold per technical committee in order of publication date, showing quantities of standards sold and names of buyers. From this analysis a committee could find out who were the buyers of its standards: educational institutions, governments, the committee's own branch of industry or other branches, buyers abroad? The answers to these questions could aid in a better application of the consensus principle.

C - For making the catalogue more easily accessible to the potential users of standards. Automation was preferred to handle the information presented, extended by new elements of information, and to print it in at least three pages in the catalogue. Three sequences were chosen:
1 - by UDC, as many entries per standard as UDC numbers
2 - by standard reference number or designation uniquely identifying the standard
3 - by technical committee
Each sequence gave all elements of information. When a

searcher found the standard of his interest in no matter what sequence, he also found all elements of information presented on that standard in the catalogue, without the need for any further searching. Use of the computer opens the possibility of choice between complete sequences and short indexes.

3.4.2 Changes

The computer-made NNI catalogue 1969 was announced in September 1969 (See NNI 1969) and the NNI catalogue 1970 was announced in May 1970 (See B.E.Kuiper, NNI, 1970). Illustrative pages of the 1969 UDC list and the 1970 committee list are given in Annex 4. The following ten changes, compared with the 1968 issue, are of interest.

3.4.2.1 Subsystem

The catalogue became a subsystem in the management information system designed at that time. Other subsytems were: the committees, the invoicing for standards sold, the members fees, the planning and forecasting of standards production.

3.4.2.2 International recommendations merged

The international recommendations of the ISO and IEC were included in each of the three main sequences, merged with the other standards, regardless of the question whether or not they had been accepted as Dutch standards. The Euronorms (automatically accepted as Dutch standards) were also merged. Of the foreign catalogues of that time, only the Belgian and British are known to show this merging in a similar manner, but were done manually (see also section 4.2 sub 4.01).

3.4.2.3 Size of the pages and cover

The size of the pages was changed from standard A5 to standard A4, making the size equal to the size of the ISO catalogue. The layout of the cover was also adjusted to the ISO catalogue.

3.4.2.4 Standards to issue

New standards expected to be issued in the near future were added to the three main lists, showing UDC number, committee, standard reference number (standard designation) and the most likely title only, omitting all other elements of information. This measure improved the response time for questions on newly issued standards.

3.4.2.5 Sequence by committee

The sequence according to committee was added, for the first time for the Dutch catalogue. This sequence is of interest to the committees themselves and to those professionally engaged in standardization; it facilitates the revision procedure. For that reason the catalogues were sent to the the committees free of charge. The subject index of the 1970 catalogue refers, inter alia, to the committees. The intro-

duction of the committees as an entry was in accordance with the practice in the ISO catalogue.

In the sequence by committee the context of a reference is significant. Generally a reader, trying to interpret information the way it is intended, will consult the context. This is sensible not only when a complete text is supplied, but also when reference information is supplied in a catalogue. In the standards themselves the complete texts should be sufficient to exclude misinterpretations. A record of reference information on standards, however, may carry more risk of misinterpretation in one sequence or context than in another. The sequences according to standardization committee, UDC number and standards reference number may be compared. The sequence according to standardization committee has the advantage that the other standards of the same committee and the full name of the committee constitute the context and help to avoid misinterpretations. The sequence according to UDC number has a similar advantage in the UDC context. The sequence according to standards reference number has no consistent or reliable context.

3.4.2.6 Subject index

The alphabetical subject index was supplemented with many new keywords taken from the standards. In the 1969 catalogue the subject index made reference to the UDC number. In the 1970 catalogue the subject index made reference to UDC number, page in the UDC sequence, committee and page in the committee sequence. The subject index is largely monolingual in the Dutch language, with a few exceptions, like "job evaluation" (=werkklassificatie). Occasionally the Dutch keywords may refer to an international recommendation in the English or French language. No consistent attempt had been made however to derive English or French keywords from the international recommendations listed in the catalogue, nor to include English and French keywords in the alphabetical list, either intermixed with the Dutch keywords, or in the form of a multilingual keyword list. No attempt had been made to translate consistently the foreign language titles into the Dutch language. Therefore the access provided by the subject index can be considerably further improved by adding and translating keywords from the international recommendations.

3.4.2.7 UDC practice

The accessibility of the standards and international recommendations through the alphabetical subject index is complicated by the different practice followed in assigning UDC numbers to standards or international recommendations. In 1969/70 the NNI assigned a UDC number to each Dutch standard separately and does not give UDC numbers to the committees. The ISO in 1969/70 assigned UDC numbers to the ISO committees and did not consistently assign separate UDC numbers to the international recommendations; often the UDC number of the committee was printed on its recommendations. When the scope of the standard is the same as the scope of the committee, this is correct. However, the UDC number of a standardization committee is generally too broad for useful application on the individual standards. If the scope of the standard is more

limited, a more specific UDC number should have been used. (See also sections 3.4.3.2 and 4.4 and 4.5 and 6.5.4.) This difference in practice meant that the UDC number taken from the ISO Recommendations in order to merge these into the UDC sequence of the NNI catalogue, were obtaining a place in the sequence away from their related Dutch standards. In other words: The UDC numbers on some ISO Recommendations in 1969/70 needed correction. The matter is somewhat complicated by the fact that the UDC also changes in the course of time: a standard which received a proper UDC number before a change in the UDC, may no longer fall in the same place as the standard on the same subject which received its UDC number after the change.

3.4.2.8 Main UDC headings

A summary of the main UDC headings was included in the catalogue as well as a subdivision into about 300 subheadings. Subscriptions to newly-published standards could be accepted only according to this classification (one or more subheadings). The assignment of an item number to the subscription, when a UDC number has already been given, serves no other purpose than simplification of the numeric code to be used on invoices etc., a consistently 5-digit code number being simpler than a decimal code of varying length.

3.4.2.9 Arrangement of the columns

The arrangement of the columns from right to left in the 1969 catalogue was the same for the three main sequences. In the 1970 catalogue a relation was introduced between the sequence of the standards (top to bottom) and the sequence of the columns (left to right), in order to facilitate searching. The columns required to find the standards in each list were placed to the left, followed by the column for the title in the middle, and the columns with the remaining elements of information to the right.

3.4.2.10 Standard designations by Arabic numerals

The alphanumeric reference of standards was recoded to become entirely numerical. NEN became 003, ISO became 020, 021, 991 or 998, IEC became 010 or 997, etc. Other prefixes and suffixes were cancelled. Drafts of Dutch standards were coded 003 8xxxx. Supplements and changes of Dutch standards were coded 003 7xxxx. See also section 3.4.3.1.

The Arabic numerals are characters equally understood by all language groups, independent of the alphabet they use. The substitution of Latin letters in the designation of the standards occurring in the Dutch catalogue by Arabic numerals and the introduction of item numbers (Dutch: bestelnummers) consisting exclusively of Arabic numerals removed an obstacle to language groups using other than Latin alphabets when referring to these standards. (Compare A.J. Mikhailov and R.S. Giljarevskij 1962).

3.4.3 Critical comments

3.4.3.1 Numeric codes and all-capital print

The recoding of letters, prefixes and suffixes, mentioned in section 3.4.2.10, was made to obtain an 8-position numerical code for the items to be sold, which could be processed by the particular invoicing machine used at the initial stage of introduction of the system. The limitation to Arabic numerals had the advantage of removing an obstacle to language groups using other than Latin alphabets. The limitation to 8 positions had the advantages connected with a code of limited consistent length, but also had the distinct disadvantage of causing inconvenience to the documentalist and to the user in general. The "8" for drafts and the "7" for supplements and alterations, placed as they were in the middle of the designation code rather than at the end (which would require a ninth position), put these documents at a place, in any sequence involving the standard designation, far away from the standard itself. The recoding of "NEN" to "003" introduces a deviation between the item number and the standard number as printed previously on the standard. These inconveniences weigh heavily against extra costs of machines capable of handling alphanumeric codes of 12 or more positions.

The three main lists (by UDC, reference number, committee) were made by a X8 computer at Philips Electrologica in Rijswijk. The remainders of the two catalogues, including the subject index, were made by hand. (Due to deadlines automation of the subject index was reserved for a later stage). The online printer of the X8 produced all-capital print (no lower case). The print danced somewhat on the lines and was less than perfect for photocopying.

The all-capital print of the 1969 and 1970 catalogues was less attractive to the eye than the 1968 issue. It is by no means surprising that in 1972, after the link between the invoicing and catalogue subsystems had been made less stringent, the original alphanumeric codes were used again in the NNI catalogue 1972 (succeeding the 1970 issue). At the same time the all-capital print was replaced. A description of the techniques used to produce the NNI catalogue 1972 has been given by L.J. Götte (1972). Illustrative page given in Annex 5. (Note: The first column on page 158, presumably showing the record numbers, should have been covered during production of the catalogue, but was inadvertently left uncovered.)

The general problem of user-acceptability of information service based on computer print-out was discussed by A. Raizada (1970). For the possibilities of photo-typesetting see H. Arntz in FID Publication 506, 1974.

3.4.3.2 Subject index

J.P.S. Rowold in 1970 reports that he spent 1½ hours with the NNI catalogues 1970 and 1968 (sic) searching for a standard on "het merken van transportbanden" (marking of conveyor belts) before finding standard number 998 43300, which is ISO Recommendation 433, drafted by ISO Technical Committee 41 "Pulleys and belts (including vee-belts)". Rowold's complaint is justified. The subject index is incomplete and does

not contain the term "Transportbanden, riemen en schijven" referring to committee nr 98041 which means ISO Technical Committee 41.

The more principle question is whether Dutch and international standards in one UDC sequence, desirable as it could be for the convenience of the Dutch user, should have been introduced before the ISO consistently assigned UDC numbers to its individual standards, rather than to its committees (See section 4.5). Under these circumstances merging is not recommendable. Omitting ISO Recommendations from the NNI catalogue simply means relying on the ISO catalogue for ISO Recommendations (later: ISO International Standards). They are in fact omitted from the NNI catalogue 1972 (succeeding the 1970 issue): ISO Recommendations are included after they have been formally accepted as Dutch standards. See NNI: Het NNI en de actualiteit (1973).

3.4.3.3 Elements of information

It may be argued that the links of the catalogue subsystem of the management information system and the desires of small user groups for certain elements of information may require all elements of information printed in the NNI catalogue 1970 to be available somewhere, but that this does not necessarily mean that these elements should all be printed in the catalogue. They could be kept elsewhere. In view of the desirability of selectively disseminated information, this argument is indeed strong and a selection of elements of information required strictly for the catalogue is to be recommended as soon as finances allow the distribution of other informative documents to users asking for them. In this connection it may be noted that the NNI catalogue 1972 omits the following elements of information from the 1970 issue:

- quarter of publication
- added since immediately preceeding catalogue
- available
- applicability of clients' discount
- quantity discount
- sheet/book/looseleaf
- languages in which the standard is available
- status of NEN
- item number of subscription
- committee

The argument that the information may be sent to customers especially asking for it may reasonably be applied to these elements of information with the exception of the committee (as element of information). For the committees see sections 3.2.1 and 3.4.2.5. It remains a question what is more attractive in practice: answering (with a relatively long response time) the requests individually when they come in, or discharging this obligation at once (with a relatively short response time)by including these elements in the catalogue. This question which affects the response time of the system as regards these elements of information, is for the sales or information departments to solve;in a catalogue layout to be approved by a majority of users the preference is likely to remain the omission of these elements of information. The fact that minorities may be interested to have them included does not change the majority opinion.

Omitting these elements of information from the catalogue may in practice mean that the information is no longer systematically collected and checked and will soon no longer be immediately available on request. In other words: omission of these elements of information considerably increases the response time of the system for questions involving these elements.

In the absence of a pragmatic measure of information utility, it may be said that it is easier not to look at an element of information provided but not needed than to look at an element of information needed but not provided.

3.4.3.4 Universal Decimal Classification

The suitability of the UDC for catalogues of standards has been questioned. The problems encountered in connection with the NNI catalogue discussed in this chapter are due, however, to the inconsistencies in practice between different standards bodies and are solvable on the international level. See chapter 4.4 and 4.5 and 6.5.4.

Little or no critical comments were heard about the printing of the UDC on three lines of 23 fixed print positions each: xxx.xxx.xxx/xxx.xxx.xxx
xxx.xxx.xxx/xxx.xxx.xxx
xxx.xxx.xxx/xxx.xxx.xxx
Since each print position is fixed, many blank spaces occur between the occupied spaces. While this facilitates sorting on punched cards, it could appear unusual to the reader.

3.4.3.5 Errors

The 1969 NNI catalogue contained relatively many errors, meaningful and trivial. The following two reasons may be given:
- Many elements of information were collected for the first time and no feedback was available from the users confirming their correctness. The 1970 catalogue benefitted from feedback from the users (as regards the repeated items).
- The facilities for checking and correcting at that time were not as developed as in later years.

3.5 SALES ANALYSIS, BY COMPUTER

While the analysis of sales of standards by NNI in the week ending Friday 31 May 1968, partially reported in section 3.3, was a one-time special analysis made by hand in order to obtain, inter alia, approximate information on the sales of categories of standards to categories of customers, the present section will briefly mention a few aspects,pertaining to sales across the Dutch borders, of the analysis of NNI sales of standards during the first quarter of the year 1969, made for the first time by computer, detailed per standard-buyer relation in a form which could in principle be used for continuous quarterly analysis of sales. (NNI/Philips Electrologica 1969) The sales across the Dutch borders have our interest in a general orientation on the accessibility of standards across the Dutch borders. Sales across the Dutch borders comprise four parts:
A - Sales of Dutch standards to standards bodies abroad.

For example: pages 204 and 205 of the computer print show the sales of the standard NEN 3347 (LC 3 = landencode 3 = countrycode 3 = The Netherlands) to individual customers belonging to the categories education (code 10), members of the NNI (code 22), foreign standards bodies (code 23) and others (code 30). Of a total of 334 copies sold, 3 went abroad, 2 to Belgium, 1 to Sweden.

B - Sales of international recommendations printed in The Netherlands (CEE, Arnhem), to customers abroad.

C - Sales of international recommendations, printed abroad, to customers in The Netherlands. For example: pages 501 through 504 show the sales of ISO Recommendations (LC 20 = landencode 20 = countrycode 20 = ISO) to individual customers in The Netherlands belonging to different categories. A total of 79 copies were sold. See Annex 6.

D - Sales of national standards of foreign standards bodies to customers in The Netherlands. For example: page 291 shows the sales of German standard 105 (LC 4 = landencode 4 = countrycode 4 = West Germany) to individual customers in The Netherlands belonging to different categories. A total of 108 copies were sold.

The import sales can be conveniently analysed and summarized per country from the sequence of the standard-customer relations shown in the illustrations. Analysis and summary of the export sales per country may similarly be made from the sequence of the customer-standard relations (i.e. from the inverted sequence), since the foreign standards bodies, acting as sales agents, are identified by a customers code.

The analysis shows the individual customers, as shown on the invoice. In many cases this individual customer is not the individual person using the standard, but rather the organization which has ordered the standard for him and which will pay for it.

CHAPTER 4

INTERNATIONAL HARMONIZATION OF CATALOGUES OF STANDARDS

4.1 INTRODUCTION

The preliminary analyses of sales of Dutch standards reported in sections 3.3 and 3.5 have shown that import and export transactions did take place: import of standards from abroad sold to buyers in The Netherlands and export of standards from The Netherlands sold to buyers abroad. These imports and exports take place in spite of possible barriers and of limited availability of reference information. Collections of foreign standards are kept in several places in The Netherlands, including the libraries of the Technical Universities of Delft and Eindhoven. The standards collection of the library of the Technical University of Eindhoven includes the USSR State standards. (NNI, August 1973; See also section 6.1.2.2.1)

Access to the primary literature in general is largely through reference information on the primary literature. Access to standards - a category of primary literature - is largely provided through the reference information in the catalogues of standards of the national and international bodies. However, these catalogues vary so widely in contents and in form that it requires many years of specialized experience to find the references to standards on a particular subject through the varying catalogues. These specialists are to be found mainly in the information centra of the national and international standards bodies.

When discussing the lack of uniformity of the standards catalogues, it is as well to keep in mind that the standards themselves also show some variety in contents and considerable variety in form and layout, between the different countries. Most of the variation in the form of the standards, however, could be aligned into a uniform catalogue, so there is no valid excuse for the standards catalogues to be as divergent as they are.

4.2 COMPARISON OF CATALOGUES OF STANDARDS

The national standards catalogues of 36 Member Bodies of ISO were studied in 1961 by A.S. Tayal. The other 8 Member Bodies had no catalogues. In 28 catalogues entries were given under subject groups in classified form, including 8 according to UDC, 1 according to alphabetical order, and 19 according to the convenience of national standards bodies. In 7 catalogues entries are given in the numerical sequence of the designation number of each standard. In 1 catalogue entries are given according to both UDC and designation number.

In 1969 H. Wellisch described the national standards catalogues as follows: "At present the layout and arrangement of the various national catalogues has virtually to be learnt by heart by those who have to find standards from various sources, and valuable information is sometimes not found because of the intricacies of the catalogues that have to be searched".

In this publication Wellisch does not illustrate his point by tracing specific elements of information in the different national catalogues. (For the main point to which his analysis is directed, see sections 2.1 and 2.3.6.)

During a meeting of commercial executives of AFNOR (France), BSI (United Kingdom), DNA (Germany), IBN (Belgium), NNI (Netherlands) and SIS (Sweden), held in August 1969 near The Hague under chairmanship of the present author to discuss problems related to sales of foreign standards, a feasibility study was suggested of a future harmonized West European catalogue of standards. To facilitate the discussion of this subject in the next meeting, scheduled for 15 April 1970, a working-paper was drafted in March 1970 by B.E. Kuiper and P.J.H.M. de Boevère of NNI, showing an inventory of basic elements of information in the most recent (1969 or 1970) standards catalogues of the six countries and the ISO and IEC catalogues of international recommendations. See Annex 7. The inventory was also intended as draft for the contents of a proposal for a future harmonized West European catalogue of standards. This proposal, however, after a preliminary discussion, was set aside later in 1970 in favour of the discussions started within the ISO on a world (rather than a West European) information system for standards (see section 4.4).

The inventory can be used to compare the elements of information contained in the computer-made NNI catalogues 1969 and 1970 with the same elements (if any) in the hand-made catalogues of the other five countries and two international standards bodies. In this comparison the following points may be noted (numbering derived from the document):

1.00 The elements of information recorded separately for each standard in the catalogue showed little or no uniformity in the 8 catalogues.

1.02 and 1.03 The only elements of information present in all 8 catalogues were the number of the standard (standard designation) and the title in the national language(s).

1.04 The title of the standard in an official ISO language (English, French or Russian) was present in the catalogues of Belgium, France, Sweden and the United Kingdom, requiring an additional language only in Sweden, and was lacking in The Netherlands and West Germany. For West Germany, however, it must be kept in mind that a separate list is issued of German standards translated in other languages.

1.08 Even the year of publication of the standards and an indication that a standard had been supplemented or corrected were present in only seven out of the eight catalogues, lacking in the Swedish catalogue.

1.12 A change since the last edition of the catalogue was indicated only in the catalogues of France, The Netherlands and the IEC.

1.13 The UDC number was lacking in three catalogues (France, Sweden and IEC).

1.15 The standardization committee of the standards body was shown in the catalogues of The Netherlands, United Kingdom and ISO only.

1.16 The standardization committees of organizations other

than the standards bodies was indicated in the catalogues of Belgium and Germany only.

1.22 Languages in which the standards are sold were shown for each standard in the catalogues of Belgium, The Netherlands, West Germany and Sweden.

2.01 All 8 catalogues contained a sequence according to the number of the standard (the standard designation or reference number).

2.02 A sequence according to UDC was included in Belgium, The Netherlands, West Germany, the United Kingdom and the ISO. France, Sweden and the IEC did not include the UDC sequence in the catalogue.

2.04 The Netherlands, Sweden and the ISO contained a sequence according to the standardization committee; the others did not.

2.09 All 8 catalogues contained an alphabetical subject index or a rudimentary keyword list, referring however to a variety of things: 5 referred to the standard number, 2 to UDC, 1 to a division based on UDC, 2 to the standardization committee, 1 to a product group, and 2 to the page of the catalogue.

3.18 Foreign and international catalogues of standards were announced only in the French catalogue.

4.01 and 4.02 Five countries (out of six) included the ISO and IEC Recommendations in their catalogues, three (Belgium, The Netherlands and the United Kingdom) merged them into the sequences.

5.03 The 8 catalogues together contained approximately 41.000 items (mainly standards), the Dutch catalogue approximately 3.000.

Observing the apparent lack of uniformity in the elements of information shown for each standard or recommendation in the catalogues, it must be remembered that the same elements of information, if shown on the standards or recommendations themselves, were by no means uniform either, as was mentioned in section 4.1. Examples are:

- translations of titles on standards. Standards of some countries did give translations, others did not. When the title of the standard is not translated on the standard, the translation must be newly-created for the catalogue. As mentioned in section 2.3.5 the translation of the titles of standards on the standards themselves is the subject of ISO Council Resolution 1959/21, and the translation of titles of standards on index cards for standards is treated in ISO Council Document 1959-14 dated March 1959.
- UDC number. Some standards show the UDC number, some do not.

Knowing that the Dutch catalogue was the only one among the 8 of which the main sequences were made by computer, the question may be raised whether it was exceptional in any way with regard to the elements of information contained. The elements of information contained by the Dutch catalogue and not contained by the other seven, however, include no elements which could not have been included equally well in a hand-made catalogue.

4.3 REPORTING ADVANCEMENT OF DRAFT ISO RECOMMENDATIONS

Beginning in the year 1970, Draft ISO Recommendations

were omitted from the ISO catalogue which is issued annually, and were issued monthly (later quarterly) in a separate computer-made publication, both in order of draft number and in order of technical committee. Beside these two elements of information the title and the advancement stage of the draft were shown: The title in English and French. The advancement stage the draft had reached was shown by a two-digit code, the first digit indicating 9 largely (but not strictly) consecutive stages.

Published ISO Recommendations appeared in the list until included in the ISO catalogue. At a later time, drafts appearing for the first time in the advancement list were marked.

The computer-made advancement list of ISO draft Recommendations has a nine stage advancement code, as had the Dutch planning and forecast list (for expected growth of standards), published in November 1969 (See section 3.2.2). However the precise meaning of the nine code numbers is different. Moreover, the Dutch list was intended to be used for both prognostication of future and for reporting of historical events in a comparable form, while the ISO list was intended for reporting historical advancement only.

The dangers in not publishing the advancement on a draft international standard or draft international standard recommendation may be illustrated by the growth of the International Standard Bibliographic Description for Monographic Publications (ISBD(M)), published by the IFLA(see section 4.8.4). Early warning signals are desired.

4.4 CREATION OF THE ISO INFORMATION COMMITTEE AND THE ISO INFORMATION CENTRE

In 1968, upon initiative of the USSR standards body GOST, the ISO Council founded the Standing Committee for the Study of Scientific and Technical Information on Standardization (INFCO) (ISO Council Resolutions 1968/42 and 1969/48). The scope of the new committee covered, inter alia, methods and procedures for compilation and dissemination of scientific and technical information on standardization, including an agreed common international classification and coding system for standards, application of mechanized means of processing, storage and retrieval of information relating to standardization, and methodological assistance on the exchange of information, publications, etc. on standardization.

In 1969 in Moscow the INFCO set up a working group Indexing, to propose a common system for indexing and retrieval of Recommendations, Standards and other standardization documents for use by the future ISO Information Centre and the documentation services of the ISO Member Bodies, including the study of:

1 - a thesaurus in the three official ISO languages (English, French and Russian)
2 - rules for the selection of keywords
3 - rules for indexing of recommendations, standards etc.
4 - rules for the drafting of titles
5 - a system for retrieval of documents based on the developed indexing system

(Document ISO/INFCO (Moscow 1969-18) 33).

In July 1969 a group of experts, including the chairman of the INFCO working group Indexing, met in Geneva in preparation of a proposal of an ISO Information Centre (Document ISO/INFCO (Central Secretariat 1) 36). The meeting concluded that UDC and keywords should both be given to standards:"UDC for classification and keywords for indexing and retrieval." Further recommendations were, inter alia:

- The system to be designed should be language-insensitive, i.e. should as far as possible avoid any pecularity attached to a language, in order to facilitate its adaptability to other languages.
- The system should be so designed as to allow both manual or automatic retrieval.
- The system should be designed for use on the basis of keywords (descriptors).
- The keywords should be listed in a dictionary (or thesaurus).
- The preferred terms (and synonyms) should be selected from the titles and subtitles of the standards and be supplemented, if necessary, with terms extracted from the text or substance of the standard (from "Purpose", "Scope" or"Conclusion" paragraphs).
- The following information should be included in the indexing of standards:
  - document (or reference) number of the standard or recommendation
  - date of publication
  - issuing organization
  - country
  - language (original)
  - status (whether improved draft standard or recommendation)
  - number of pages
  - UDC to be allocated, wherever possible, to the descriptors
  - Once a keywords list has been established and agreed in several languages:
    - Reference numbers adopted conventionally would be allotted to the descriptors, with a view to facilitating the exchange of information in different languages and between satellite information centres.
    - Title-giving should be improved so as to align with the established keywords lists and thus facilitate and improve information retrieval.

It is noteworthy that the group of experts did not deal with the question of centralized control of classification, a question dealt with in a publication that same year by H. Wellisch, who proposes a centre which would standardize the usage of UDC for standard classification by assigning approved and uniform UDC numbers.

The statement "UDC to be allocated, wherever possible, to the descriptors" may call up associations with the idea of a concordance between UDC and thesaurus, although the term concordance is not mentioned. Likewise, the use of the expression "satellite information centres" suggests a steering function by the international centre over the national information centres, although this is not specified in so many words.

In September 1969 the ISO Council resolved that the ISO Information Centre be established (ISO Council Resolution 1969/58), to supplement the information held on standardization in national centres, act as a clearing-house between member bodies for information held nationally, and to compile information on internationally issued standards. The programme included, inter alia, the following points:

- An indexing system used both for storage and for exchange of information based on a common keyword list as described in the recommendations of the meeting of experts.
- A continuation of placing UDC numbers on ISO recommendations.
- The ISO Information Centre would index all internationally issued standards. The member bodies would index their own national standards and supply their lists to the ISO Information Centre; where it would be typed onto tape for processing on a computer (to be contracted out to a computer company).
- Information as to what the ISO Information Centre had on file would be supplied to all member bodies by way of quarterly or monthly ISO Information Centre Abstracts.

A brief report of the early activities of INFCO was given by J. Lochard (1971).

From 1 September 1970 until 22 October 1971 the present writer was responsible for designing an international system for reference information on standards. As secretary of INFCO he informed INFCO of the plans for the ISO Information Centre in September 1971 (ISO/INFCO (Secretariat-11) 87, Sept.1971), showing "Whom to serve, what to collect, what to issue" as well as "technical forms in which output information is available". Progress was reported to the ISO Council in Sept. 1971 under agenda item "Technical information" and covered the keyword list, coumputer programming, languages, possibilities for following years, indexing of ISO Recommendations and microfilming (ISO Council Document 1971 - 10.2/1, Sept. 1971). The international system for a world catalogue of standards (WSC) will be the subject of section 4.5 and forms a part of the present dissertation.

As a contribution to the work of INFCO, the USSR Member Body of ISO in Sept.1971 reported the situation, as regards information, in the ISO Member Bodies (ISO/INFCO (USSR-17) -71, undated, issued Sept.1971). The report gave the results of a survey by questionnaire sent by GOST to all ISO Member Bodies, of whom 23 answered. The countries which answered were:

Austria	Hungary	Poland
Bulgaria	India	Rumania
Canada	Iraq	Switzerland
Cuba	Italy	Thailand
Czecho-slovakia	Japan	UAR
Denmark	Korea P.P.R.	UK
France	New Zealand	USSR
Germany	Peru	

Of these 23 countries 17 used the UDC for standards, 7 published information on projected standards, one had actually completed a computerization project: India had completed a computer-made keyword-in-context-of-title list. The international relations reported included the exchange by some of

standards, index cards, journals and standards catalogues. The frequency of revision of national standards varied from two to ten years. The number of national standards, not counting branch standards, was reported by 20 countries, varying from 2 to 11.834 and totalling 101.380. Main groups of information users included inter alia: traders, industrialists, educators, scientists, students, research organizations, manufacturers, design enterprises, standardization committees, government departments, professional bodies, trade associations, universities, local bodies, libraries and skilled workers. Suggestions to improve the information on standards involved among other things:

Bulgaria	- completion of the collection of foreign standards
	- unification of information procedures
	- implementation of the Russian language as official ISO language
Denmark	- retrieval of information on standards based on telephone or telex communication
India	- implementation of UDC on standards
	- unification of catalogues or yearbooks and supply of an exhaustive indexing system so that the standards on a particular subject may be known from the yearbooks or catalogues published by other standards bodies
Poland	- publication of the work of standardization committees in ISO countries
	- design of obligatory models of an information carrier for supplying all kinds of information to the ISO Information Centre
Switzerland	- implementation of the translation of titles on the first page of standards into English and French.

Another contribution to the work of INFCO was made by the DNA, the German Member Body of ISO, reporting a study of the mechanization and use of computers for storage, retrieval and dissemination of information on standardization (ISO/INFCO 95, Febr.1973). The study was based on the answers by Member Bodies to two questionnaires mailed by DNA to all Member Bodies and the Central Secretariat (INFCO/DNA Circular letters N1, presumably 1970, and N2, presumably 1971). The main question of the first circular letter was: "Did you already mechanize the documentation in your national standards institution or in other relevant scientific or technical facilities?". 28 Member Bodies replied as follows:

2 had changed over to mechanization and used computers: UK and USSR

7 were planning mechanization and use of computers: Czechoslovakia, Denmark, France, West Germany, Paraguay, Poland and Sweden.

19 were not planning mechanization or use of computers

28 in total replied.

The USSR Member Body reported that the mechanization and use of computers in the field of standardization would be part of a complete management information system. The Netherlands Member Body did not answer the first questionnaire. As mentioned in section 3.2 NNI had computerized the NNI catalogue 1969 as part of a management information system as designed

at that time. The second circular letter contained the question shown in the Annex 8. Answers were received from 18 countries and the ISO Central Secretariat. The report states (on page 33) that complete answers to the questionnaire were received from Norway, the USSR and the ISO Central Secretariat. Five (France, Norway, UK, USSR and the Central Secretariat) were going to establish the mechanization of the documentation by the use of computers. Four (Czechoslovakia, Germany, Poland and Rumania) planned the use of computers for documentation. The remaining ten (Australia, Austria, Denmark, Egypt, Ghana, Hong Kong, Ireland, Netherlands, New Zealand and Spain) reported no mechanization. The answer for the Central Secretariat was given on 12 August 1971 by the present writer and is shown in Annex 8. The answer by the Netherlands Member Body reads: "We regret to inform you that we can not answer the questions of the questionnaire concerning the use of computers, as we do not use a computer in our institute. We have published a computer-made catalogue, but most probably our catalogue 1972 will be printed the normal way." As mentioned in section 3.4.3.1 it turned out that the NNI issued an improved computer-made catalogue in 1972.

In September 1971 INFCO decided to keep the preparation of a uniform presentation of standards catalogues on its programme, and a study on the standards catalogues of 14 countries and ISO and IEC was published in February 1973. See Annex 9. The results show "the wide disparity, even amongst the members of INFCO, of standards catalogues presentation." (ISO/INFCO 99, Febr. 1973). See also Annex 8. The report also:

1-points out that standards are documents and catalogues of standards should conform to international standards for catalogues of documents, if and when available
2-recommends inviting the ISO Technical Committee 46 Documentation to consider whether the cataloguing of documents is a proper subject for their attention, as already suggested by a UNISIST working group
3-states that "Further action on the preparation of a uniform presentation for standards catalogues should be dependent on their advice."

While point 1 is substantially correct and point 2 is understandable, the present writer criticizes point 3 as erroneous. Progress in cataloguing, or in any other field of activity, should not be made dependent on the eventual (Dutch: uiteindelijk) advice of a standardization committee. Standards for the cataloguing of documents are useful for compatibility, merging and exchange of information about documents. The standardization committee may render service to the cataloguers (who should be represented in the committee) by unifying the catalogues. Lack of progress in formulating the standard should not delay a desirable unification at a lower level or in a smaller context. The creation of a uniform world catalogue of standards in any acceptable form is more important than the eventual compliance to standards which still have to be drafted. Standards have no meaning of their own; they derive their meaning from the improvement of the activity or product they standardize. Standards for cataloguing only constitute a means, a uniform catalogue is the aim itself, second only to the aim of improving accessibility of all standards. The advice "If the standards you need do not yet exist, make your own!" should be as valid for the ISO

Information Centre as for others. When a uniform catalogue of standards has been agreed and created by participants, it may still be conformed later to the international cataloguing standards when and if they become available.

This same principle was applicable a number of times in the design of a world catalogue of standards (section 4.5). At the time the information system was designed, several elements had not been sufficiently standardized internationally, so that standards for internal use had to be improvised, until international standards became available or became projected later. See section 4.8, and also sections 5.2.4 and 6.5.1.

In May 1974, as a contribution to the work of INFCO, the USA Member Body of ISO sent out a questionnaire to the Member Bodies about the "Uniform presentation of standards catalogues". The questionnaire did not ask for facts about existing catalogues but asked what items should be included in a (model) national standards catalogue. The answers are surveyed in document ISO/INFCO 141.

In 1973 INFCO prepared the following documents of a highly preliminary character, related to the present study:
- Coordination of the translation of standards.
- Standardization activities of national and international organization other than ISO Member Bodies.
- An ISO information network.
- ISO relationships with UNISIST.
- ISO and the proposed international referral service for environmental information.
- World lists of standards in a specific subject field.

As regards membership of INFCO, up to 1972 the developing countries, which have the most urgent need for improvement of the international accessibility of standards, were hardly or not at all represented in the ISO Information Committee, while the countries that were represented all had a relatively modest need for improved accessibility. The arrival since 1973 among INFCO members of representatives from developing countries, including Nigeria and Ghana, may be instrumental in focussing attention on the interests of these countries. Therefore it is to be hoped that their voice will receive the special attention of the other committee members until the time when their number will be proportional to their interest. The need of a developing country for world information systems is described by M.N.G.A. Khan (1974).

4.5 TOWARDS A WORLD CATALOGUE OF STANDARDS (WCS)

In response to the requirements and desires described in previous sections, and in accordance with the ISO Council Resolution 1969/58 a new design was made for a catalogue of ISO Recommendations. The data to be recorded and the layout of the catalogue to be printed by computer were so chosen that they were also applicable to national standards of ISO Member Bodies and to standards of other organizations, serving as a step towards the more remote aim of issuing a world catalogue of standards. Since this more remote aim would involve the cooperation of the ISO Member Bodies, the design was submitted for comments to members of INFCO on

18 December 1970. Since only two comments were received, from Poland and Sweden, a circular letter was sent to INFCO members (Kuiper, B.E. to members of INFCO, 23 April 1971) again inviting comments, which were then received from six countries and from ISO Technical Committee 37 Terminology. The comments showed that a further explanation was desirable, and the design was again explained, this time exemplified by a hand-made facsimile of the intended computer print-out in a circular letter, also reviewing the comments received: B.E. Kuiper to Members of INFCO, World list of standards and related documents, ISO/INFCO (Secretariat-5) 60, Revision 3. The application codes were worked out so as to require a minimum of recodifying of existing codes, in document ISO/ INFCO (Secretariat-9) 82, Sept. 1971. These two documents are available from the ISO in Geneva.

The UNESCO, promoting both standardization of documentation and documentation of standards, invited the present writer to write an article about the information system being developed for ISO. In response to this invitation the article "Towards a world catalogue of standards" was submitted to UNESCO in October 1971. The publication was delayed until May 1973 due to international developments outside the scope of the present subject matter. This dissertation relies on the article for a description of the WCS system.

When the present writer returned to his home country, the computer programming had started. It was completed according to plans and the programme was first applied to ISO Recommendations and ISO Standards. The data were input using the forms for optical recognition (See Annex 8). Illustrations of the output are given in Annex 10. They show complete agreement with the hand-made facsimile mentioned earlier in this section, with one exception however: the blanks in the fixed positions for the UDC number were erroneously filled up with zero's. These zero's should not take the place of the blanks since they may be confused with the significant zero's of the UDC code. The multilingual lists of descriptors, alphabetical in each language and numerical, made by computer in agreement with the hand-made facsimile, were issued as photocopy in Febr. 1973 (ISO/INFCO (Working group 1) 97). The computer print is of the all-capital type and the catalogue programme did not provide for a lower case. Consequently the print was not as presentable as the print of the Norwegian NSF Catalogue 1971 or the Dutch NNI catalogue 1972, both computer-made with both capitals and small letters. Therefore the computer print was not used directly for the catalogue, but the most important elements of information were reset and printed conventionally for the ISO Catalogue 1973 as it was issued.

To the ISO catalogue 1973 were also added some features, not introduced into the computer programme but taken from previous ISO catalogues made by hand. One of these features should be criticized: UDC numbers are assigned to technical committees and all standards are listed under that UDC number and are not listed under the UDC number shown on the standard. The complete UDC sequence made by the computer was not included in the catalogue as issued but was reserved for possible mailing to the documentation centres. In this way

the benefit obtainable from the UDC was largely lost.

While the WCS information system (including the computer-made catalogue of ISO Recommendations) had the potential to improve the international accessibility of standards by collecting and merging bibliographic data from all ISO Member Bodies, no world list, partial or total, has been put out by this programme up to the year 1973.

Examples of partial mergings, demonstrated or indicated, operational or planned, may be mentioned:

- The CICS system for exchanging index cards for standards (chapter 2), in its UDC sequence merged the standards from all participating members. The card indexes were kept mostly in the offices of the ISO and the NSB's, but were in principle obtainable by others. They were not published in bookform.

- The world lists of standards in specific subject fields (plastics, rubber, paper, see this section below) are merged outputs (on plastics computer-made, on rubber and paper hand-made), published and made available accross the borders.

- acquisition lists of foreign standards received at the libraries of BSI, SII and ISIRI.

- From contributions made by the USSR and German Member Bodies of ISO to the work of the ISO Information Committee (see section 4.4) it is indicated that some information systems of national standards bodies combine, somehow, the national and foreign outputs on reference information to standards. The indications however, seem less than completely conclusive as to the question whether the outputs are or are not combined by re-inputting to obtain a new merged output, uniform as to substance and form, in order to facilitate the searching for standards at the home offices of the standards bodies. There is no indication in these reports of external availability to intersted parties abroad of these merged outputs, if any. The system used by the USSR Member Body, possibly the most advanced of the national systems, is described in USSR State Standard GOST 7.7 - 69 (see section 6.1.2.2.1). As long as these systems are not accessible across the borders, their contribution to the international accessibility of standards will remain very modest. This circumstance is not altered by the fact that collections of foreign standards, in libraries of standards bodies, are usually open to the public.
  The observation made here that merged outputs are not available accross the borders does not mean to imply any unwillingness to make them available. The willingness may in fact be alive.

- The NNI Catalogues 1969 and 1970 included ISO and IEC Recommendations (both those accepted and not accepted as Dutch standards) in the three main sequences of these catalogues. The UDC sequence in particular illustrates the significance of the merging.

- The system designed for a world catalogue of standards (see this section above).

- According to an announcement in the ISO Bulletin of July/August 1974, the BSI has published the first issue of a "Worldwide list of published standards" which is to appear on a monthly basis, arranging entries from 106 standards organizations by subject and in UDC order. Though this announcement came too late to include the list in the present study, it may possibly turn out to be a major advance in achieving an internationally merged output.

It is noteworthy that countries having advanced information systems for standards, happen to be the same ones having the largest and most advanced collections of national standards. Their contributions to the input of a world catalogue of standards are most needed. At the same time, their own need for the output is relatively modest. On the other hand countries lacking advanced information systems for standards often also have but small collections of national standards of their own. Their contribution to the input can only be modest, but their need for the output is relatively great.

Through the years a few world lists of standards in specific subject fields have appeared:

- In 1965 E.J. Struglia reports that the "Catalog of selected foreign electrical standards", distributed by the American Standards Association is a classified list of national electrical standards issued by 38 foreign countries.

- About the year 1966 the Indian Standards Institution compiled a bibliography of foundry standards for the annual meeting of the International Foundry Congress held around that time in India.

- In 1968 V.P. Vij reports that the "index of Welding Standards from 21 Nations" of the International Institute of Welding gives a complete bibliography of welding standards from 21 nations.

- In the USA a world index of plastics standards was published by L.H. Breden (editor) of the National Bureau of Standards in 1971. It is a computer-produced index containing the titles of more than 9000 national and international standards on plastics and related materials, including standards published by technical societies, trade associations, government agencies and standardization bodies. It was intended to serve as a reference for those who want to know if there are standards covering a particular plastics material, product or test method. The index is of the Key-Word-in-Context (KWIC) type, giving the title under all the keywords it contains.

- In India a World List of Standards has been published on the specific fields of Rubber and Rubber Products (June 1972) and Paper and Paper Products (Aug.1973) by the Indian Standards Institution. The standards are classified in subject groups according to materials used, manufacturing process

and use. There is one sequence: under each subject-group the standards are arranged according to countries in alphabetical order (in English) and standard designation in alpha-numerical order.

- E.J. French (1974) reports that I. Prokop and V. Vanickova (1973) have prepared a bibliography of national and international standards in the field of documentation, terminology, data processing, classification and related subjects.

4.6 INPUT AND OUTPUT DEVICES

Section 4.4 mentioned the questionnaire of the German Member Body of ISO and the answers given for the ISO Central Secretariat to the questionnaire (Document ISO/INFCO 95, Febr.1973). See Annex 8. A few points concerning the input and output devices are of interest.

The optical reading input form was chosen as main input device for the following interrelated reasons:

- Typewriters, with optical-character-reader character set (OCR-A character set), are relatively simple among the machines for preparing machine readable input. Simplicity is an immediate necessity for standards bodies in developing countries who may want to join the programme and contribute their input.
- In cases where a typewriter is not available, the optical reading input form may be filled in by pen or pencil and sent to the central secretariat for typing before machine processing. In other words: the input must be directly readable by both machine and man. Note: The service to type hand-written input centrally does not put a heavy burden on the central agency, if this service is limited to those who do not have a suitable typewriter available, since they are also likely to be the ones having a small quantity of input to contribute.
- It is sometimes advantageous that the input medium may be sorted by hand and than checked, and that corrections may be made by hand replacing a carrier of incorrect information by a correct one. Punched cards or magnetic tapes do not meet these input requirements, the optical reading input form does. Punched cards are, however, a second form of input allowed in the system as designed, while the system may be extended to receive magnetic tapes.

The printer 1403 N1 was chosen as output device for the following reasons:

- Low cost of further processing of the print.
- By reducing the print to standard A4 paper size, a maximum of information may be carried on one page. Since the world catalogue of standards, when complete, will contain more than 100.000 standards in three sequences, it is desirable to minimize the volume of print. The complete world catalogue of national and international standards is thus estimated to occupy approximately 50 centimeter of book shelf. For the volume of storage in terms of the number of characters, see section 6.1.1.

4.7 SEARCH KEYS

The possibilities for searching may in principle be based on any of the elements of information included in the record, or combination thereof. In practice, the immediate possibilities for manual searching are limited to the key-words or combinations thereof and the keys which form the basis for the sequences (Technical Committee, UDC and reference number of the standard). Possible extensions as foreseen will be mentioned in section 4.8.2.

4.8 POSSIBILITIES FOR REVISION AND RECONSTRUCTION

4.8.1. Introduction.

In section 1.4 it was stated that an international system for reference information on standards should not be expected to last forever, but that revisions and reconstructions of the system will be required sooner or later. While the CICS system for international exchange of index cards for standards (Chapter 2) had in this respect the advantage of being entirely manual and allowing many years of development with revisions by flexible human actions, the system for a world catalogue of standards of section 4.5, being an automated system, does not have the advantage of flexibility to the same extent. Foreseen extensions involve additional programming while the system remains maintainable, and unforeseen revisions involve reprogramming while the system may or may not remain maintainable depending on the flexibility of the system.

Comparing the CICS and WCS systems, another aspect treated by Nielen in 1970 may be mentioned (abridged quotation):

> "... By management (beheer) of information systems we mean the management of subsystems delegated to specialists in measuring, transporting and storage. Delegation involving people requires some specification of data, which may be flexible and liable to change, but delegation involving a computer requires a very complete and precise specification. Manual information systems therefore require constant attention to quality and meaning of the messages turned out, and automated information systems require a constant attention to reprogramming in connection with evolving demand for other data".

The attention to quality and meaning of messages required in a manual information system may be illustrated by the constant attention for the UDC required in the CICS system for international exchange of index cards for standards (section 2.3.6). The constant attention to reprogramming in connection with evolving demand for other data required in an automated system will be illustrated in this section by some known or likely or conceivable evolutions of demand for modified data in the reference records for standards. The desirability to identify subsystems of relatively long duration, which may be redesigned without redesigning the system in its entirety (see section 1.4) applies here to each element of information, particularly since some elements of information (bibliographic description, country code) are being discussed internationally (inter alia in the UNISIST working group for tools of systems interconnection), in other words outside the circle of possible participants in the system.

Filing sequences, formats etc. are also being discussed.

Some points in connection with the world catalogue system of section 4.5 should be kept in mind when discussing possible alterations:

- some elements of information in the reference record may, each separately, evolve as to form and contents demanded, due to developments outside the information system and its parent organization; the elements to which this applies may preferably be modules by themselves in order to improve maintainability.
- in anticipation of the possible evolution of unforeseen demands for data the main input and output forms had reserved fields of 200 positions
- the input forms were designed for use in many countries; as soon as actual operations have extended over several countries, alterations in the forms involving the people supplying their input data should be rigidly limited, and made, if at all, at long intervals, in order to avoid undue burdens on the suppliers of the input (See also N. Gove et al. 1974).
- The evolving demand includes the desires of users, many of whom are themselves actively participating in standardization work related to documentation and information processing; they may require that an international catalogue of standards be a shining example of the implementation of their standards. This is understandable. Some may demand, however, that a choice of interim-standards for the catalogue be postponed until they have formulated their standards. This is unreasonable since it would paralyze unnecessarily the design and development of information systems for standards (see also section 4.4). (For the necessity of using interim-standards see also N. Gove et al. 1974).

4.8.2 Possible extensions as foreseen

When the WCS system was analyzed and the computer programme made, it was foreseen that the following extensions would sooner or later be required:

- inclusion of the Cyrillic alphabet or its standardized transliteration into the Roman alphabet would necessitate an extension of the sorting programmes. See the Russian Standard GOST 16876-71 "Transliteration of Russian words into Roman letters". The same would be required for the inclusion of any alphabets other than Cyrillic or Roman.

- the multilingual list of descriptors for standards could be developed into a multilingual thesaurus, indicating relations between terms: broader term, narrower term, synonym, and the logical links "and", "or" and "not". The programme allowed grouping of descriptors in at most four groups of at most five descriptors. The principle involved is illustrated by the search on DATRIX for theses relevant to the present study (See Annex 11). Using combinations of descriptors, individual search questions could then be formulated for retrospective searching, yielding the records of the standards as answers to the questions. Similarly users' profiles could be formulated for a selective dissemination

of information (SDI) containing the records of the pertinent standards.

- draft standards could be added to the files and processed like standards

- a citation index for standards, based on citations of standards in standards and in draft standards, could be made from the data on related standards. These relations are of a thematic nature and are based on the indications of the authors, in this case the standardization committees. A citation index inverting the backward relation "(draft) standard referring - (draft) standard referred to" to the forward relation "(draft standard referred to - (draft) standard referring" is a desirable searching tool for a standardizer studying the revision of standards.

- the UDC was programmed as a search key for the standards showing a UDC number. It was foreseen that after the possible development of a concordance or switching mechanism between the UDC and the thesaurus for standards, searching would be possible for standards showing either UDC or descriptors (Compare H.Wellisch 1973). See also section 6.5.4.

- foreseen in a roundabout way, not as an extension of the programmed system, but as a possible project supplementary to the world catalogue of standards and going further in scope, was the bringing together of standards on the same subject by UDC or possibly by Technical Committee, in order to open the possibility to make state-of-the-standardized-art surveys and to compose analytical comparative reviews of all standards on the same subject. These reviews may include the scope and field of application of the standards. The analytical review could be encyclopedic in nature following the UDC or Technical Committee sequence or an alphabetical order in some language or languages. An encyclopedic world review of standards would mean a major advance in making standards internationally accessible to all those not professionally specialized in the subject of the particular standards. On the value of encyclopedic dictionaries to those outside the specific profession involved, see H. Arntz 1973.

- after a period of operation, use may be made of the experience of answers given to the questions asked by users. These answers may be made available to others as they are, or may be condensed, ordered to subject or according to user having asked the question. and published. This general experience could also be used for reformatting newly incoming questions and publishing them with the answers.

4.8.3 Possible revisions

It was understood that developments outside the system in regard to certain elements of information in the system would possibly require revisions (not just extensions) of the programme:

- inclusion of a third title language could not be accommodated in the fixed field for titles, and would not fit ele-

gantly in the reserve field.

- the filing sequence for mechanical cataloguing purposes was being discussed internationally outside the system. For the UDC notational elements and their filing order see J.H. de Wijn in FID Publication "UDC in relation to other indexing languages" (1971). A uniform filing sequence of letters, numbers, punctuation-marks and special symbols, may be agreed upon internationally as part of an international filing standard (R. Coward 1973). Provided no distinction is made between manual and computer filing, this newly standardized filing sequence could be used in the lists of the standards catalogue. Of the four sequences of the WCS, two may not involve letters (Technical Committee and UDC). The standard designation and the list of descriptors do contain letters. A newly-defined filing sequence may be seen as an extension and combination of the ancient standardization efforts concerning the letters a through z in the alphabet and digits 0 through 9 in the decimal notation. If we define an alphabet as an ordered character set (Dutch: geordende karakter verzameling), wherein the sequential order of the characters is defined, this work to obtain the specificity required for computer sorting may simply be seen as the completion of the alphabet. (See also: U.K. Library Association, Working party on computer filing rules, 1972, and ISO Draft International Standard 2788, 1972.)
- country codes were standardized in ISO Recommendation 639 "Symbols for languages, countries and authorities", 1967, but were under reconsideration. In the year 1973 the new codes were to issue as ISO Draft International Standard 3166 "Code for representation of names of countries". A new standard for country codes would make adjustment of the programme desirable. (For similar adjustments in IAEA-INIS see N. Gove et al. 1974).

4.8.4 Possible reconstruction

The record of each standard may be considered to consist of an identification element (standard designation or reference number), a bibliographic description, content analysis elements (the Technical Committee; the information languages UDC and descriptors; related standards) and a reserve space of 200 positions. At the time the contents and format of the record were designed, no internationally standardized bibliographic description was available. The record may therefore be considered to contain a homemade standard bibliographic description for standards, to be reconsidered as soon as bibliographic descriptions are standardized internationally. Compliance to such a new standard would most likely involve reconstruction of the programme.

In 1973 ISO Draft International Standard 2709 "Documentation - Format for bibliographic information interchange on magnetic tape" was still to be issued. This standard specifies requirements for a machine format which will hold any type of bibliographic record, intended for communication between systems, not for use within systems. It does not define the content of individual records.

The internal processing format of each individual organization must be converted into this communications format.

To facilitate the conversion, access to each single element of information is required. (See also P.E. Irich and P.E. Mongar in FID Publication 493, page 64).

The first standard edition of the "International Standard Bibliographic Description for Monographic Publications (ISBD(M)"was still to be issued, as, in fact, it was in 1974. It specifies, inter alia, requirements for the description of, and assigns an order to, the elements. It does not deal with organizational factors (headings etc.) used in arranging entries in a catalogue.

The UNISIST working group on bibliographic data interchange makes a comparative analysis including, inter alia, the ISBD(M), the UNISIST Reference Manual for Machine-Readable Bibliographic Descriptions (which will form a part of the Manual for Systems Interconnection being prepared), the MARC, INIS, AGRIS and ISIS, taking into account four levels of bibliographic data interchange standards, with emphasis on 2 and 3:

1 - general record formats
2 - tagging structure of data elements
3 - definition of data element content
4 - standards of general application (e.g. transliteration, country codes etc.)

See UNISIST Newsletter No 3 (1973).

From the above publications no bibliographic description of standards for use within an information system for standards, which specifies the contents and format of the elements of information, is as yet apparent. In early 1974 no other specification seems available to replace the provisional one descibed in section 4.5. A standard for the bibliographic description of a document must be elaborated by type of document. The standard for the bibliographic description of standards (as a type of document) should fit into a series of similar interrelated standards for other types of documents. See P. Lazar et al. (1974).

The representation of bibliographic elements is being discussed in the UNISIST working group "Tools for system interconnection",and a manual is expected to issue in 1974.

4.8.5 Possible abandonment

The implementation of the system for issuing a centrally compiled and processed world catalogue of standards would require an effort from the participating organizations. Since full benefits would be obtained only if participation were substantially complete, it may be better to abandon the plan than to implement it only partially (as was done with the CICS system). Abandonment could be in favour of a simple network, limited to an exchange agreement without central processing or distribution of output. In such a network any participant could still ask for all references and merge them in any way he preferred. For individual questions involving all inputs he would have to communicate with all other participants rather than with the central agency alone.

In 1974 E.J. French et al. report that in the ISO Infor-

mation Network access to the network will be through the NSB in each country and through the ISO Information Centre in Geneva for International Organizations.

This network for exchanging information on standards should not be seen as competing with the WCS system or vice versa. The network is desirable with or without a WCS. A WCS is desirable with or without a network. In the network the WCS system may function as a central subsystem. Without the WCS, the network will require more limited agreements and will be more easily implementable, but the benefits will also remain more limited.

Abandonment of the WCS system should preferably be in favour of a subsequent system combining the salvage values of the WCS and several other systems (see section 6.1.3.9).

P. Nador (FID Publication 498, 1972) describes the introduction of a centralized information-switching facility as a means for exchanging information between various nodes of a network. He calls this facility an Integrated Information System which must ensure that all susbsystems have access to the same data, and which requires that all data shared between subsystems are combined in a central data base. In contrast, a Dispersed Information System allows each subsystem to have its independent data files. According to Nador, a data base management system is needed to exchange data between subsystems in a network and should include a common terminology for data and for the contents of the data base, and a common definition of data structures. Nador has right. The present author prefers Nador's Integrated Information System to his Dispersed Information System as far as reference information on standards is concerned.

CHAPTER 5

INFORMATION SYSTEMS OF ISB's AND IMOSIO's

5.1 INTRODUCTION

In this chapter the information and documentation systems of the International Standards Bodies (ISB's) other than ISO, and the International Mission Oriented Standard Issuing Organizations (IMOSIO's) enumerated in section 1.1, will be considered from the viewpoint of how standards are entered into the system and how they may be retrieved. Readers not interested in the descriptions of rather detailed searches may continue reading at section 5.3.

5.2 A FEW INFORMATION SYSTEMS IN MANUAL OR AUTOMATED OPERATION

5.2.1 International Bureau for Weights and Measures (IBWM) and International Organization for Legal Metrology (IOLM)

5.2.1.1 IBWM

The IBWM establishes international standards and measurement scales of physical quantities. It verifies national standards and measurement scales and determines physical constants. Standards of the metric system are stored in the IBWM: the meter and the kilogram, for example, as platinum objects.

Official decisions regarding units, standards and methods of measurement are taken by the General Conference of Weights and Measures (GCWM) and are published in the "Comptes Rendus des Séances", for example the "Comptes Rendues des Séances de la Quatorzième Conference Generale des Poids et Mesures, Paris 4-8 Octobre 1971". These conferences are held approximately once every four years. A survey of the most important decisions is given in "La Système International d'Unités (SI), 2e edition, 1973", published by the IBWM. The current work of the IBWM is published regularly in the "Recueil de Travaux du Bureau International des Poids et Mesures". The work of the consultative committees is published by the International Committee for Weights and Measures, for example: "Comité Consultatif des Unités, 3e session-1971, 23-24 août." Seven consultative committees exist, i.e. for: electricity, ionizing radiations, meter, phonometry, second, thermometry and units.

While standards in this study are mostly documents carrying information of a normative nature, some of the standards kept by the IBWM are physical objects. Standards for meter and kilogram are pieces of metal. This is in agreement with the two forms a standard may take according to the ISO definition (see section 1.1). The international accessibility of these pieces of metal can hardly be discussed together with the international accessibility of the documents. The same holds true, in varying degrees, for standard materials

kept or mailed for reference by other organizations, such as the standardized samples of biological substances of the World Health Organization (section 5.2.6). Contrary to standards fixed in pieces of metal, physical constants determined by the IBWM may be fixed in a document, and it makes sense to study their international accessibility together with standards-documents. See also J. Thierry, undated, quoting NEN 1221 through 1226.

The IBWM standards are accessible only by studying the above literature. The author found no list or catalogue.

5.2.1.2 IOLM

The IOLM serves as international documentation and information centre on methods of verifying and checking measurements. It studies ways of harmonization of legal metrology and determines general principles of legal metrology. The IOLM publishes quarterly the "Bulletin de l'Organization Internationale de Métrologie Légale". In the March 1974 issue, a list is given of the 34 international recommendations issued by the International Conference of Legal Metrology and 8 recommendations still waiting for approval by the conference. The accessibility of these documents may be studied along with standards from other organizations. Their number is small and no instrument for their accessibility has been found other than the list quoted.

5.2.2 International Electrotechnical Commission (IEC)

The IEC is the international electrotechnical standards body, affiliated to the ISO. It participates in ISO/INFCO, in particular through IEC Technical Committee 1 Terminology, which also has issued the International Electrotechnical Vocabulary (IEV) with a General Index (IEC publication 50(00)).

The IEC Catalogue 1969 was among the catalogues studied in section 4.2. The IEC catalogue 1972 lists standards issued by IEC in the numerical order of the standards designation. No particular meaning for this order is apparent to the inexpert reader. It is conceivable that the order of the numerical designations is based on a chronology other than the publication date of the standard. An alphabetical subject index made from abbreviated titles refers to the page in the catalogue. The UDC is written on the standards, but is not used or shown in the catalogue. Also not shown or used in the catalogue are the Technical Committees. In another publication of IEC, the Supplement to the Handbook 1973, a "List of IEC publications arranged in order of Technical Committees" is given. Under each committee the standards are in the numerical order of the standards designation. In the Handbook and the Supplement the UDC and the alphabetical subject index are absent.

A Report on IEC Activities 1971 contains the progress of the subjects under consideration in a Technical Committee or Subcommittee for 1971. It is supplemented by a complete list of all final drafts submitted for approval and of publications issued during the year, or in course of printing.

The Catalogue of IEC publications 1973 also lists the standards of the International Special Committee on Radio-interference (CISPR).

5.2.3 International Telecommunication Union (ITU)

The ITU issues worldwide standards recommendations drafted by the International Consultative Committees (CCI's) for telephony and telegraphy (CCITT) and for radiocommunications, including television (CCIR). The CCITT issues standards for interfaces between data terminal equipment and the telecommunications network, including, inter alia, data transmission, pulse code modulation, alphabets and data networks (See M.F. Hill. 1972).

The "ITU List of publications" (Oct. 1973, 4 pages) lists in Chapter VI the publications of the CCITT, including the CCITT - Blue Book of the third Plenary Assembly in Geneva 1964 and the CCITT - White Book of the fourth Plenary Assembly in Mar del Plata 1968. (The CCITT Green Book of the Fifth Plenary Assembly in Geneva 1972 issued in 1973). Chapter VII lists the publications of the CCIR, including the XIth Plenary Assembly in Oslo 1966 and the XIIth Plenary Assembly in New Dehli 1970. The word "standard" is not found.

Conclusion: The international standards issued by the ITU are not accessible through the term "standard".

5.2.4 International Atomic Energy Agency - International Nuclear Information System (IAEA - INIS)

The IAEA has a mission within the field of nuclear science. In cooperation with other international organizations, it has established basic standards and recommendations relating to all aspects of radiation safety. IAEA regulations for safe transport of radioactive materials have been adopted as binding standards by many governments and have been included in the conventions of international organizations concerned with transport.

The INIS collects bibliographic information from its 56 participating member countries or international organizations (1973) on the publications issued in the field of nuclear science in each country or international organization. Among the documents collected are the standards issued in the field of atomic energy, in particular radiation safety, by the IAEA itself and by others. This bibliographic information is collected, merged and issued as an INIS Atomindex, in book form, as microfiche and as magnetic tape. Among the international organizations supplying bibliographic information is the IAEA herself; in other words: publications of the IAEA are merged with other inputs. Among the IAEA publications are the IAEA standards, and they are merged with standards from other participants. The IAEA publications are also listed in the IAEA catalogue.

The IAEA Catalogue 1972 contains an alphabetical index where each title is listed under the first word (other than

"A" or "The") and also under keywords. "Standardization" is listed three times referring to three different pages (52,34, 44) and "standards" twice referring to two more pages (24,27). On these pages are found "Basic Safety Standards for Radiation Protection" (Safety Series no 9 - STI/PUB/147), "Radiation Protection Standards for Radioluminous Timepieces" (Safety Series No 23 - STI/PUB/167), "Standardization of Radioactive Waste Categories" (Technical Reports Series No 101 - STI/DOC/10/101), "Standardization of Radionuclides" (Proceedings Series - STI/PUB/139) and "Preparation and Standardization of Radioactive Reference Sources" (Review Series No 14 - STI/PUB/15/14).

In the INIS Atomindex (June 1973) the entries are arranged in subject categories. Within each subject category the entries are arranged alphabetically by author. One of the subject categories is C53: Radiation Protection Standards.

The INIS Thesaurus (May 1973) lists the term " standards" and gives use-references to "calibration standards", "safety standards" and "specifications". Under these terms we find that they have been used 176, 177 and 639 times respectively by indexers. The term "specification" however is not used for standards only, but also for "design"and "technical specification". Under the term "recommendations" are listed, inter alia, the related terms "ISO" (indexed twice), used for "international standard organization" (sic!), and "safety standards".

The INIS Descriptive cataloguing rules (June 1972) describe the INIS Worksheet containing, inter alia, a literary indicator which may be specified as a standard, thesis, bibliography, etc. The instruction reads: " - circle if the main topic of your piece of literature is to define a standard or specification (not restricted to official publications of national or international standardization organizations)".The INIS Manual for Indexing (dec.1971) says about the literary indicator (page 9): "This indicator can be used as a research element complementary to the descriptors". In a personal communication to the present author Z.I. Turkov of the INIS Section of the IAEA writes in Febr. 1974:

> "For the sake of flexibility the concept of "standard" has been introduced as a literary indicator independently of the kind of literature in which it is published. This would also include draft standards, standards specifications, etc. It is, therefore, not possible to say that literary indicator "standard" belongs to any specific type of record, although the majority of standards issued would probably be included in a monographic type of record (B,R).
> The literary indicators in Tag 008 are intended as search elements; this makes it possible to retrieve and select all standards entered into the system by search on literary indicator "W". We have, however, ourselves no experience yet as to the volume involved in our data base."

In the INIS Description of computer programs (April 1972) G. Del Bigio and H. Schmid describe the programs written in Programming Language I (PL/I) and Assembler programming languages for an IBM 360, 64K computer working under

Disc Operating System (DOS) in a 54K partition and used at IAEA to process the INIS computer-readable data. The computer was used because of the amount of data and "to minimize the time-lag occurring between the time when the information is available (i.e. published) and the time it is usable (i.e. accessible to the potential user)", in other words to handle data traffic and to shorten response time. These programmes for operation on a worldwide basis form a system composed of subsystems making possible the extraction of a working subsystem without great difficulty.

The INIS Terminology and codes for countries and international organizations (Revision 2, 1971) with Addendum (April 1973) show the two-letter codes used by INIS. The Addendum draws the attention to the fact that an ISO standard is in preparation (issued as ISO Draft International Standard 3166, 1973), which means that the codes will be changed in due time. This illustrates the principle that home-made standards are needed until standards at higher level become available in order to make progress possible. It is difficult to conceive that INIS would have delayed using codes for countries and international organizations until the ISO standard had been adopted. (Note: the existing ISO Recommendation 639 "Symbols for languages, countries and authorities", 1967, was not suitable for the purpose). In other words: destandardization was required. See section 1.6 and also section 4.4, referring to document ISO/INFCO 99.

The INIS has recently been reviewed by Z.I. Turkov and A. Chepkasov (1974). Among other things they mention:
- the systems participating in INIS provide their output, i.e. the input for INIS, in different physical forms: worksheets, paper tape or magnetic tape. The communication format for each of these forms is the same.
- a clear definition of subject scope is needed.
- the main communications structure is of the star-type and achieves equal access to the data base by any participant as well as mechanized central merging of inputs and central preparation of various forms of output.

W.U. Vaden et al. (1974) report four disadvantages to the local participants (paraphrased):
- undesirable rigidity in the local system is created by the relinquishment of local autonomy to the standardsetting central operating unit.
- this rigidity may create operating inefficiencies and delays at the local level, pending resolution of recommended changes to subscribed standards.
- revisions of standards require time consuming local review and implementation.
- before improvements in hardware or software can be made in a local system, all participating systems may have to be outfitted for the change.

and three advantages:
- interchangeable files
- the potential of labour saving
- availability of nonconventional literature from all participants.

The four disadvantages are "largely computer related

and would not necessarily apply to organizations involved in preparing manual documentation to decentralized input".

J.E. Woolston (1974) while recapitulating the key features of INIS, starts with the following three:

(1) decentralization of the task of identifying and recording information as it is produced, each nation (or region) being responsible for reporting what is produced in its own territory;
(2) centralized merging of material reported by the different input centres, the task being performed in an international agency through international financing;
(3) output products tailored to the needs of advanced institutions with computer facilities, as well as printed indexes that can be used by institutions without such facilities, and by individual scientists.

He also refers to the participation of 22 developing countries in INIS.

The INIS atomindex data base may be searched by the IBM storage and Information Retrieval System (STAIRS), comprising terminals with keyboard, graphical display and printer. During a demonstration of such a terminal in Drushba, Bulgaria the present author on 30 September 1974 had the INIS Atomindex files searched for the descriptors: safety and standards and Netherlands. First the frequences of occurrence of each descriptor separately (as number of descriptors and number of documents) and of the three combined were shown on the graphical display. The three descriptors occurred combined in 2 documents. When requested, the records of the two documents appeared on the graphical display and on the printer. They showed publications by J. Hamstra (1973) and by P.Mostert (1973).

The INIS procedures, with slight modifications, served as a base for the FAO - AGRIS system (see section 5.2.5). The INIS checking and production programs were used for the experimental issue of the FAO - AGRIS Index published in August 1973.

5.2.5 Food and Agricultural Organization - International Information System for Agricultural Sciences and Technology (FAO - AGRIS)

The FAO aims at raising the levels of nutrition and standards of living of the people and at securing improvements in the efficiency of production and distribution of all food and agricultural products.

The FAO and WHO have founded the Joint FAO/WHO Codex Alimentarius Commission (CAC) wherein the member states of the two parent organizations may participate, to adopt and publish standards for food products, including both quality requirements and analytical methods. Quality requirements include acceptable levels of additives and pesticide residues. Some analytical methods may be obtained by the CAC from ISO Technical Committee 34 Agricultural Food Products. As the standards become accepted internationally, they are published in the Codex Alimentarius. The standards of the CAC are in-

cluded in the documentation and information services of the FAO. In the contents of "FAO Publications, bibliographic catalogue 1945 - 1972" the CAC Series are found in the chapter "Nutrition" in the subchapter "Series", as distinguished from the subchapter "Monographs and Meeting Reports". The CAC Series lists the methods of analysis, recommended international codes of hygienic pratice and recommended international standards issued by the secretariat of the Joint FAO/WHO Food Standards Programme, FAO, Rome. The analytical methods used to test the quality requirements of food products of the Codex Alimentarius may originate in the standards of the ISO Technical Committee 34 Agricultural Food Products.

In 1967, the FAO Documentation Centre was established. Its methodology has been described by G. Dubois (1970). All FAO publications and most unpriced technical documents are catalogued and indexed by the FAO Documentation Centre and announced in "FAO Documentation, current bibliography", issued monthly, and containing indexes by division of the FAO, by author and by subject. In the subject index the main descriptor "food standard" refers to titles which contain this descriptor. In yearly cumulative KWIC (KeyWord In Context) indexes the following descriptors are provided, among many others:

- codex alimentarius
- code of practice
- code of principle
- feed standard
- food legislation
- food regulation
- food standard
- quality standard
- standard
- standardization

None of these descriptors necessarily refers to a standard or draft standard. The reference is to a publication carrying these descriptors, and the descriptors are assigned if the publication is a standard, or is about a standard, etc. If one is interested only in the standards and draft standards themselves, the ultimate selection must still be made from the references. In other words: a separation function remains to be applied. The author index and subject index are accumulated annually. FAO documents from before the year 1967 are classified by technical discipline.

The FAO Documentation Centre also publishes retrospective special indexes containing bibliographic references to FAO publications and documents issued since 1945 on many subjects, including "food and nutrition" and "environment". The food and nutrition index is computer-produced and contains a bibliographic list, and indexes by author, and an analytical index. Each bibliographic entry of the bibliographic list includes an identification, authors, title, indexing synopsis and source, date, pages etc. The indexing synopsis is made by indexers by choosing descriptors from a vocabulary of standard indexing terms, proposing keywords (new descriptors) as desired, and linking descriptors and keywords by other words into the synopsis. The index by author lists "ISO" as the author of two ISO Recommendations: "ISO R 937 Meat and meat products, determination of nitrogen con-

tent" and "ISO R 1443 Meat and meat products, determination of total fat content". The analytical index lists alphabetically essentially all descriptors and keywords from the indexing synopsis, in the context of the synopsis. The analytical index is preceded by two pages showing a selection of indexing terms (descriptors and keywords) used in the index, grouped under 26 major subject headings, including "legislation" and "standards", with an indication of the frequency each indexing term has been used. An indexing term may appear under more than one heading; for example ""quality control" appears under both legislation and standards. The heading "standards" shows the following 13 indexing terms with their frequences:

1	APPELLATION D ORIGINE
30	CHEMICAL ANALYSIS
26	CHEMICAL COMPOSITION
15	CHEMICAL FORMULA
30	CODE OF PRACTICE
17	CODE OF PRINCIPLES
60	CODEX ALIMENTARIUS
10	ECE CODEX ALIMENTARIUS
255	FOOD STANDARD
23	PESTICIDE TOLLERANCE
95	QUALITY CONTROL
43	QUALITY STANDARD
51	STANDARDIZATION
676	references

Together there are 676 references, referring to a smaller number of entries, due to replications. These indexing terms do not necessarily refer to standards or draft standards. Even the indexing terms "food standard" and "quality standard" may refer to a publication on standards. From these 676 references (or the smaller number of entries referred to) the selection of standards and draft standards may still be made. The context of the descriptor may be of some help in making this selection. For example the frequently occurring context "...giving recommended international food standard for ..." clearly refers to a standard. In any case, for a user interested in standards only, a separation function is still required.

In 1970, a group of experts started a study on the documentation, not limited to FAO publications, of agricultural libraries over the world, and presented their results in 1971 as AGRIS, to be organized on two levels:

- AGRIS level 1 : current bibliography in all spheres pertaining to the competence of FAO
- AGRIS level 2 : a network of abstracting services supplying on request current and retrospective information on research projects

In Sept.1972, the first draft of "AGRIS Guidelines for the preparation of bibliographic descriptions" issued. From the draft we learn that the guidelines are based on the INIS guidelines (INIS Descriptive Cataloguing Rules, Document IAEA-INIS-2), and that, for the experimental issue of the AGRIS bibliography, use was made of the INIS software. A meeting of specialists on bibliographic descriptions in Oct/Nov 1972 proposed modifications, including a modification to distinguish the form of documentary units by grouping all the types of record and literary indicators of the INIS system in a

single sequence, excluding only monographs and serials for another sequence. This matter should be considered with caution in the light of the fact that one document may belong to more than one type of record and in the light of the fact that terminology had not yet been standardized. Here Recommendation 15 of the International Symposium on the Documentation of the United Nations and Other Intergovernmental Organizations (F.A. Casadio (rapporteur) 1972) is applicable: "As no convincing research has been done on the classification of documentation by types and categories, it is directly recommended that a study of this subject be carried out by the Symposium organizers or under their auspices. Another study could be done with a view to submitting proposals for the standardization of terminology." The proposed modification would have affected standards as literary indicators in the INIS system. However, the proposed modification was not accommodated in the experimental issue of the AGRIS bibliography. While the literary indicator code "W" is used in INIS for a standard, the same literary indicator code "W" in AGRIS is used for legislation. While the type of record code "C" is used in INIS for a collection, the same type of record code "C" in AGRIS is used for a standard. The motive given for this change in a footnote of the guidelines is "... to allow the utilization of W for laws and other legislative acts...". This reshuffle to make place for laws could have affected one of the other record types, but standards were picked! Fortunately the (by-) product of the reshuffle was not unfavorable to standards: standards became a type of record. Classifying standards as a type of record in AGRIS means that they may be searched separately from other types of records. But a searcher for standards has to phrase his question differently for AGRIS and INIS.

The participants in different countries contribute their output as input for the AGRIS level one international data processing centre, which will merge these contributions to establish an agricultural documentary data base with worldwide coverage, which may be used for SDI and for the production of special bibliographics by broad category, by language, by country and by other suitable parameters, both in printed form and on magnetic tape.

The Agrindex (experimental issue 1973) is comprehensive: the user can find complete world coverage in one place. A high degree of accuracy and a minimum delay after publication of the documents are expected. See document FAO/AGRIS 5 (1973) and G. Dubois in FID Publication 506 (1974).

5.2.6. World Health Organization (WHO)

The objective of the World Health Organization is the attainment by all people of the highest possible health, inter alia by improvement of nutrition, housing, sanitation, recreation, economic and working conditions and other aspects of environmental hygiene. Its activities include dissemination of information and standardization. Chapter V of the Constitution states that it will have authority to adopt regulations concerning, inter alia, standards with respect to diagnostic procedures and standards with respect to safety, purity and potency of biological, pharmaceutical and similar

products moving in international commerce.

The WHO standards may be found in the WHO Catalogue 1947 - 1971 and the supplement 1971 - 1973 (April 1973). Following the advice given to readers on page 2 of the catalogue, one should first consult the contents and next the subject index. In the list of contents, "Biological standardization" is the only term including the stem "standard". In the subject index the words "standards", "specifications", "criteria" and "guides" are not mentioned. Going through the catalogue page by page the following publications involving standards may be found outside the section "Biological Standardization":

- Standardization of methods for conducting microbic sensitivity tests. Technical Report Series No 210, 1961.
- International standards for drinking water. Third edition 1971.
- European standards for drinking water. Second edition 1970.
- Control of water pollution, a survey of existing legislation. Reprint from the periodical International Digest of Health Legislation, 1966, Vol 17 No 4. From the abstract: "...dealing with such questions as...legal standards for the concentration of pollutant in effluents..." Looking at this periodical, one finds a subject index with each volume; the index of volume 21 (1970) does not contain the term "standard" as an entry.
- Standardization of procedures for the study of glucose-6-phosphate dehydrogenase. Technical Report Series No 366, 1967.

And in the supplement 1971 - 1973:

- Biological substances: International standards, reference preparations and reference reagents. 1972.

Other references do not indicate standards but make the reader wonder whether the contents differ from what could be expected in a standard. For example the "International Pharmacopoeia" and the "Specifications for Pesticides". Another example is:

- Permissible levels of occupational exposure to airborn toxic substances. Technical Report No 415, 1969, by the joint ILO/WHO Committee on Occupational Health.

A reading not only of the reference to the report, but also of the report itself, confirms the expected similarity with standards. The report specifies, inter alia, a list of 24 industrial and agricultural chemicals, with safe concentration zones recommended for international adoption. While the report does not carry or use the term "standard", the recommendation for international adoption of permissible levels of airborn chemicals is essentially a standard.

Still another example is:

- Health hazards of the human environment, 1972.

The book contains primary or secondary information of a nature expected in a standard: The concentration limits of pollutants as recommended by a WHO Expert Committee on Air Quality Criteria and Guides for Urban Pollutants as long-term

goals, are found on page 41; and the recommended levels of radioactivity in drinking water derived from the International Commission on Radiological Protection (1959,1964 and 1966) and the IAEA Basic safety standards for radiation protection (IAEA 1967) are summarized on page 66. The inclusion of this information in the book does not make the book a standard, but the information may satisfy a searcher for standards. The searcher cannot tell from the reference to the book in the catalogue. He can tell from the alphabetical index in the book itself, where the term "standard" is one of the entries (on page 385) and refers to the appropriate pages in the book.

Every five years the WHO issues a bibliography. In "Publications of the WHO 1963 - 1967" (1969), technical publications are grouped in alphabetical order by subject, the subject headings being based upon those used in the Index Medicus. "Standardization, Biological,see Biological Standardization" is the only entry on the stem "standard". It refers, inter alia, to some international biological standards.

In summary: To a searcher for standards, the Catalogue and the Bibliography of the WHO are not, or only with great difficulty accessible.

The WHO has not developed a computerized information system of its own, but is making use of existing systems, in particular the Medical Literature Analysis and Retrieval System (MEDLARS) developed by the National Library of Medicine in the U.S.A. The "Medical Subject Headings" (MESH) of the National Library of Medicine are used by medical libraries, including the library of the WHO, as standard subject headings, monolingual in the English language, for the subject catalogue. MESH presents the subject headings under which all citations will appear in the Index Medicus. It serves as the basis for search formulation in retrieval by computer of bibliographic citations stored on MEDLARS tapes. It contains an alphabetic list and a catagorized list. For certain specified categories of subject headings, it is permitted to use subheadings, although not every subject heading in the category is suitable for use of all subheadings assigned to it. Therefore familiarity with the definitions of the subheadings will be of assistance to the users of the Index Medicus. Sixty subheadings are given, including "standards". This subheading may be used with the following categories:

D Chemicals and Drugs
E Analytical, Diagnostic and Therapeutic Technics and Equipment
F Psychiatry and Psychology
H Physical Sciences
I Anthropology, Education, Sociology and Social Phenomena
J Technology, Commerce and Industry
L Communication, Library Science and Documentation
N Health Care

Definitions of standards are given as follows: "-Used with facilities, personnel and programs for the development, testing and application of standards of adequacy or acceptable performance; used with chemicals and drugs for standards of

identification, quality and potency; includes health or safety standards in industries and occupations."

Since 1972 the WHO has a MEDLARS Centre. The suitability of this subject system, which is monolingual in the English language, for international use, must be questioned. For advantages and disadvantages of subject systems in general see A.I. Mikhailov and R.S. Giljarevskij.

5.2.7 International Labour Office - Integrated Scientific Information System (ILO - ISIS)

The ILO issues the Conventions and Recommendations adopted by the International Labour Conference. Both the Conventions and Recommendations are considered by ILO international minimum standards of social policy. The International Labour Conventions are designed to create obligations after ratification by individual countries. International Labour Recommendations are considered by ILO standard defining instruments intended as guides, not as obligation-creating instruments. The "International Labour Code 1951" embodies 100 Conventions and 92 Recommendations, arranged according to a classification by subject matter: general conditions of employment; the employment of children and young persons; the employment of women; industrial health, safety and welfare; social security; industrial relations; and administration of social legislation. The "Conventions and Recommendations adopted by the International Labour Conference 1919-1966" embodies 126 Conventions and 127 Recommendations, arranged according to their adoption in the successive sessions of the Conference.

The ILO also issues standards not adopted by the Conference but by committees. They include international standards of social policy, Model Codes of health and safety, and standards adopted by industrial committees.

INTERMEZZO

Someone interested in technical standards, recommendations or codes of practice, encouraged by the knowledge that ILO issues standards, may look in the ILO Catalogue 1969 with supplement 1969 - 1971. As an inexpert searcher he may read on page 6 of the supplement the title "International standards and guiding principles, 1944 - 1968". If he orders this publication he will find that they concern relations between employees and workers and he will look in vain for technical standards. Should he have known from the statement in the catalogue: "Labour - Management Relations Series No 34"? Probably he should. Looking again in the catalogue for something on standards he finds no standards under "s" in the alphabetical catalogue (Section II), no codes of practice under "c". On page 20 under "d" he reads "Discrimination in Employment and Occupation: Standards and policy statements adopted under the auspices of the ILO". Heaving learned from his "labour - management relations" experience that standards are not all technical standards, he by-passes this reference. On pages 74 and 75 under the heading "Studies and Reports" he finds the titles "International standard clas-

sification of occupations" and "The international standardization of labour statistics". On page 79 under the heading "Subscriptions and Rates" and the subheading "IX Special Publications" he finds "codes of practice" without further reference. On re-reading his eye may linger on page 13 under the heading "Occupational Safety and Health", but standards or codes of practice are not mentioned here. However, in ILO publication D.15/1972 "Publications on occupational safety and health" he finds on page 1 the heading "Codes of Practice" listing 7 titles, and on page 7 under the heading "Meetings of Experts" the title "Meeting of experts on the standardization of certificates and registers relating to the test and examination of lifting machinery and gear used in the loading and unloading of ships, Geneva, 1956". By now the inexpert searcher may wonder: How are ILO standards, other than those pertaining to social policy, accessible?

So much for the intermezzo. It does not follow the ILO is not using the term standard strictly enough. For an explanation of the use of this term see the Preface of the "International Labour Code 1951". It does illustrate, however, that, for the inexpert searcher for standards, the terminology around different types of standards needs clarification and de facto standardization. While this clarification may be available in principle, it still needs implementation in the documentation access aids.

The ILO composes, for internal use only, a weekly computer-produced current awareness list of selected titles of documents received at the ILO from the outside, plus a nearly-comprehensive listing of new ILO documents (E. Levy in FID Publication 506, 1974, pages 314-316).

The ILO - ISIS system has been described by W.D. Schieber of ILO (1971 and 1972). The storage and retrieval system has been integrated with the ILO library operations to the extent that library cataloguing and subject analysis operations create the input for the system. ISIS published in 1971 "International Labour Documentation" which is updated bi-weekly.

ISIS was conceived in 1964 as a documentation system which would enable document analyses to be machine-processed, with various lists and indexes in the KWIC-type format prevalent at that time. The system began as a simple card-based system run on automatic data-processing equipment. The system advanced to a disc-based system and allows on-line updating and searching of the files using remote terminals (graphical displays and teleprinters). As an international record format a modified MARC - II structure is used. The ISIS bibliographic record contains an abstract consisting of a number of descriptors selected from a controlled vocabulary (thesaurus). The data base (1970) contained bibliographic records discribing documents held in the ILO collection. In addition to the on-line retrieval functions, the main catalogue files are used to print a full catalogue of master records in bookform and a variety of special purpose indexes to information in the master file. Inverted files are main-

tained to provide access points, other than the record serial number, for retrieval, for example by title, author, subject or any other data element in the record. The logical record of the inverted files consists of the access point or key and the list of master records which have been indexed under this particular access point. Catalogues and indexes are considered as "types of output which attempt to satisfy requests of information before they occur, rather than at the time a request is received. Therefore they must necessarily include all information that is anticipated to be needed. Catalogues are, by and large, full listings of the file ordered in some particular sequence. Indexes are principally extracts of one or several individual data elements from the file, which, after sorting and printing, provide pointers to a complete listing of the record".
The ISIS system supports catalogue listings by control number and by some particular element within the record.

The ISIS programmes are written for an IBM 360 computer, model 30 or larger, in 360 Assembler Language for Disc Operation System (DOS).

Selective dissemination of information (SDI) is provided periodically by passing formulations against the data base.

To pass data to and from other organizations, the ISIS system provides a program for conversion of the data transmitted in ISO format into the ISIS internal storage format. Similarly a program is provided which creates an output file in ISO format from any standard ISIS data base.

In 1968 M.P. Marthaler and A.K. Mc Gurk described in a FID publication the way international labour standards are to be dealt with in the ISIS system. In a 12 position field two positions are for the International Labour Standards Code (ILS code); one position differentiates between two types of international labour standards: a convention or recommendation; three positions identify the convention or recommendation; five positions locate the part and article or annex of the convention or recommendation where the international labour standard is to be found; and one position is a check position. However, the present author found no evidence of implementation of the Marthaler and Mc Gurk publication.

5.2.8 International Civil Aviation Organization (ICAO)

The ICAO was formed under article 43 of the Convention on International Civil Aviation (Chicago 1944). It aims to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport. Part I of the convention contains, among other things, a chapter concerning International Standards and Recommended Practices (SARP's). Based on article 37 of the convention, 16 Annexes to the convention have been developed, which contain the SARP's. The ICAO Air Navigation Commission (ANC) and its 11 subcommittees consider modifications of the Annexes.

Separate from the Annexes, the ICAO publishes Procedures

for Air Navigation Services (PANS) and Regional Supplementary Procedures (SUPP's).

On the inner back-cover of an ICAO technical publication one may find under the heading "ICAO Technical Publications" the definitions of international standards, recommended practices, procedures for air navigation, services and regional supplementary procedures. On the outer back-cover one may find the 16 Annexes and 4 PANS listed by number, title, edition and price. The procedure for obtaining amendments is indicated. The amendments are also announced in the ICAO Bulletin.

Since the definitions of SARP's, PANS and SUPP's illustrate the gradation between standards and related documents, they are cited in full, together with a statement on technical manuals:

"INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES are adopted by the Council in accordance with Articles 54, 37 and 90 of the Convention on International Civil Aviation and are designed, for convenience, in Annexes to the Convention. The uniform application by Contracting States of the specifications comprised in the International Standards is recognized as necessary for the safety or regularity of international air navigation while the uniform application of the specifications in the Recommended Practices is regarded as desirable in the interest of safety, regularity or efficiency of international air navigation. Knowledge of any differences between the national regulations or practices of a State and those established by an International Standard is essential to the safety or regularity of international air navigation. In the event of non-compliance with an International Standard, a State has, in fact, an obligation, under Article 38 of the Convention, to notify the Council of any differences. Knowledge of differences from Recommended Practices may also be important for the safety of air navigation and, although the Convention does not impose any obligation with regard thereto, the Council has invited Contracting States to notify such differences in addition to those relating to International Standards.

PROCEDURES FOR AIR NAVIGATION SERVICES (PANS) are approved by the Council for world-wide application. They comprise, for the most part, operating procedures regarded as not yet having attained a sufficient degree of maturity for adoption as International Standards and Recommended Practices, as well as material of a more permanent character which is considered too detailed for incorporation in an Annex, or is susceptible to frequent amendment, for which the processes of the Convention would be too cumbersome. As in the case of Recommended Practices, the Council has invited Contracting States to notify any differences between their national practices and the PANS when the knowledge of such differences is important for the safety of air navigation.

REGIONAL SUPPLEMENTARY PROCEDURES (SUPP's) have a status similar to that of PANS in that they are approved by the Council, but only for application in the respective regions. They are prepared in consolidated form, since certain of

the procedures apply to overlapping regions or are common to two or more regions.
TECHNICAL MANUALS provide guidance and information in amplification of the International Standards, Recommended Practices and PANS, the implementation of which they are designed to facilitate."

The "Lexicon of terms used in connection with international civil aviation", second edition D 64, brings together a number of terms in English, French and Spanish, which are relevant to the work of the ICAO. Besides the trilingual vocabulary, the Lexicon contains a list of definitions, including two definitions for "standard", for use in relation to air navigation matters and air transport matters respectively (term 2353 on pages 314 and 315).

The "Catalogue of ICAO Publications, 1974 edition" is not for sale. It contains a chapter "4. Annexes to the convention on international civil aviation", listing the 16 Annexes (containing the SARP's). Looking at the Annexes themselves, above the titles are seen the words "International standards and recommended practices". In the catalogue, however, the word "standard" is not found. Chapter 5 of the catalogue lists 4 PANS and 1 SUPP.

The "Index of ICAO Publications, cumulated edition 1970", published in English only, is presented alphabetically as a combined author and subject list of headings, tracing subjects from their committee or commission to the corresponding council working-papers and minutes. The terms "standard" and "international standard" do not occur as subjects.

Conclusion: The international standards and related documents issued by the ICAO are not accessible through the term "standard".

5.2.9 Intergovernmental Maritime Consultative Organization (IMCO)

The IMCO provides a machinery for cooperation among governments on matters affecting international merchant shipping and to ensure, inter alia, that the highest possible standards of safety at sea and of efficient navigation are achieved. In international conferences, IMCO adopts conventions which, after ratification, may be included in legal regulations (Dutch: wettelijke voorschriften) of each country. Conventions may concern technical matters and IMCO has liaison with several ISO Technical Committees, in particular with ISO/Technical Committee 8 Shipbuilding (See: NNI. Liaison bespreking ISO-IMCO. 1973). The purpose of the liaison is to promote the consistency between the ISO standards and the regulations resulting from IMCO conventions. Part of these regulations are normative technical documents and their accessibility is of interest to a searcher for standards. In cases where the IMCO conventions simply refer to existing ISO standards, the question of accessibility is reduced to the accessibility of ISO standards. However, this is the exception rather than the rule. In "IMCO Publications 1973" a modest number of publications is listed by subject: general, oil pollution, ship construction, navigation, cargoes, faci-

litation of travel and transport and legal matters. The titles, with one exception, do not contain the words standard or standardization, but contain the words conference, convention, recommendation, regulations, code, manual and glossary. The one very specific exception is the title "Standardized model forms 1-6 (II-1969)" of the Convention on Facilitation of International Maritime Traffic, 1965. This terminology is in line with the legal nature of the mechanism: conference - convention - ratification - law.

The terminology implies that the inexpert searcher for normative technical documents in the maritime field, who is not acquainted with the nature of the machinery (voluntary standardization by the non-governmental ISO or binding legislation by the intergovernmental IMCO), will not find the documents of interest to him if he is limited to the concepts used within one machinery only. To enable him to find what he wants, links are required between the concepts used in voluntary standardization and binding legislation, in casu between the concepts of ISO and IMCO. These links could be entered into a structured thesaurus. The liaison structure of the committees, in casu the liaisons between the ISO Technical Committees and IMCO conferences,could aid in finding some significant links and could even be developed into a road of international access to standards and related normative documents. (See sections 2.3.4 and 3.2.1 and 3.4.2.5).

5.2.10 World Meteorological Organization (WMO)

The WMO aims at facilitating worldwide cooperation in the establishment of a network of stations for making meteorological observations. It promotes standardization of meteorological observations and it ensures uniform publication of observations and statistics. It contributes to international standardization of methods, practices and instruments used in meteorology. It has interest in meteorological aspects of peaceful uses of atomic energy such as study of radioactivity in the atmosphere and the standardization of measurements. It is involved also in the standardization of national data from monitoring air pollution.

Reference information and abstracts of the WMO publications are given in a catalogue " Publications of the World Meteorological Organization 1951 - 1973". In this catalogue the term "standard" is not a key leading to publications which contain standards. The catalogue contains three sequences plus an alphabetical order of the titles. The three sequences are by subject, by series and by constituent body. Standards or standardization are not among the subjects, series or constituent bodies. The alphabetical order of the titles is the only starting-point in this catalogue for the inexpert, unsuspecting searcher for standards, convenient only to the extent that the first word of the title is "standard" or "standardization". One title is found starting with the word standard:

"Standards and procedures for the presentation of processed data in digital form"

Two titles are found starting with the word standardization:

"Standardization in hydrology and related fields - Activities of FAO, UNESCO, WHO, WMO, IAEA, ISO, IAHS."

The abstract, found in the sequence by subject, indicates no standards.

"Standardization of the measurement of evaporation as a climatic factor"

The abstract, found in the sequence by subject, indicates a new definition of "evaporation" for overcoming difficulties in standardization of measurements owing to lack of uniform definition.

The inexpert, unsuspecting searcher, realizing that the term "standard" may appear somewhere else in the title, may read through the entire list of titles and find the following two titles:

"Note on the standardization of pressure reduction methods in the international network of synoptic stations"

The abstract, found in the sequence by subject, indicates that this note "...recommends methods for practical use..".

"Technical standards of high-speed data transmission"

The searcher, further realizing that the fact that a publication contains a standard need not necessarily show in the title at all, may start reading all abstracts and will come across the following three titles:

"Global data processing system. Further planning of the storage and retrieval service"

In the abstract: "...suggest standard retrieval formats for archived data...".

"Guide to meteorological instrument and observing practices. 4th edition"

In the abstract: "This guide lays down the basic standards of instrument and observing practices..."

"Aerological diagrams" (WMO-No 66. TP.25,1957)

Nothing in the abstract hinted at standards.

How surprised he will be to read in the abstract under another title that this publication describes standard diagrams:

"Les représentations graphiques en météorologie"

In the abstract: "Gives a comprehensive description of all non-standard methods of graphical representation. It contrasts with publication WMO-No 66. TP.25, Les diagrammes aérologiques, which described standard diagrams ..."

The searcher for standards will now begin to realize that he has passed other titles and abstracts containing not the term "standard", but other terms such as technical regulations, specifications of codes, guides, recommendations for harmonizing methods, which terms may or may not lead to standards.

Conclusion: The catalogue "Publications of the World Meteorological Organization 1951 - 1973" is not, or only with great difficulty, accessible for an unsuspecting searcher for standards.

5.3 REVIEW

As regards coverage of standards, the information systems may be reviewed as follows:

- ISO and IEC deal mainly with standards and have worked the concept into their identification codes.
- IBWM and IOLM have a very limited number of standards listed in periodical publications.

- IAEA-INIS marks standards as "literary indicator" used as retrieval tool supplementary to keywords.
- FAO-AGRIS marks standards as "type of document" used as retrieval tool supplementary to keywords. "Standard" is in the list of descriptors but it does not necessarily refer to a standard.
- The WHO Catalogue and Bibliography are difficult of access to a searcher for standards. MEDLARS knows standards as a subheading.
- ILO-ISIS has worked the concept "standards" into the document identification code. Their standards mainly concern standards of social policy found in conventions and recommendations.
- ITU, ICAO, IMCO and WMO do not use the concept "standard" as a tool for document retrieval.

The term "standard" has different meanings in the IMOSIO's. The way each IMOSIO enters standards (according to its own meaning) into its information system is different also.

The computerized information systems of IAEA, FAO, WHO and ILO are essentially internal systems offering less to potential users outside the own organization. (Compare FID Publication 506, pages 126 and 274). The definitions, formats and internal standards of these systems differ to the extent that no over-all access is possible (compare FID Publication 478, pp 160-161), not for their documents in general and not for standards in particular.

CHAPTER 6

THE INFORMATION NETWORK FOR STANDARDS

Section 6.1 applies some known as well as some newly suggested characteristics to the information systems for standards. Section 6.2 gives a few citations. Section 6.3 applies some known theoretical insights concerning information systems in a management structure to the systems for standards. Section 6.4 points to the problem of separating standards from other documents. Section 6.5 describes possible functions of a central agency in an information network for standards. Section 6.6 describes a few features of the standards information sub-network in the UNISIST network.

6.1 CHARACTERISTICS OF INFORMATION SYSTEMS

In section 1.8 some known characteristics of information systems in general have been mentioned. In section 6.1.1 the question is asked for each characteristic whether it is significant or not for the information systems described in chapters 2,3,4 (section 4.5) and 5 in the environment of these systems. Since quantitative measures of these information systems are largely lacking or not available to the author, the question will be dealt with in a qualitative way. In section 6.1.2 the question will be raised whether the descriptions of these information systems for standards suggest any characteristics, other than the characteristics of section 1.8, which are of importance to systems for standards. This section touches, inter alia, on compatibility with other systems covering (some) standards, on accessibility to the qualified and inexpert users and on the spreading of information. In section 6.1.3 a qualitative comparison of the characteristics of the systems described will be given, leading to a combined salvage value of the systems. Section 6.1.4 indicates that some characteristics reflect potentialities which are not necessarily conclusive for the realities around international systems.

6.1.1 Significance of the characteristics of section 1.8.

When dealing with information systems for the international accessibility of standards, the significance of the characteristics of section 1.8 varies greatly. Some characteristics had a low degree of significance under conditions prevailing for systems in the environment of standardization in the years 1968 - 1973. Under the same conditions other characteristics were significant, and some had such a high degree of significance that they may be used as criteria. When a characteristic does not have a high degree of significance in the time period covered (1968-1973), the present study takes it for granted and pays little attention to it.

1 and 2 - Reliability and accuracy are essential characteristics, but when given reasonable attention in the system for standards, they may be taken for granted and will not be discussed extensively here.

3 and 4 - Maintainability (to continue doing what was planned) and flexibility (to absorb unplanned changes in observations of a changing environment) are significant characteristics in the environment of international standardization where changes in programming and techniques (including changes in computing machinery) may often be desirable and changes in the environment have become frequent in recent years.

5 - A long life-span is a desirable characteristic in international information systems, including those for standards. Life-span is perhaps the most comprehensive single characteristic in an evaluation of systems. Its comprehensiveness has the disadvantage, however, that it is dependent to some extent on almost all other characteristics and that, by itself, it gives little insight in the weak points of the systems. Further-more, life-span should be supplemented by periods of construction and salvage. Life-span will not be discussed extensively here.

6 - Response time is a significant characteristic of national and international systems for standards. For information systems for standards of one nationality only, the response time, when given reasonable attention, will not be critical. In an evaluation of systems of national scope, response time could be taken for granted. For international accessibility of standards, however, the characteristic is very significant. The response time may be so long that the information is no longer needed and the user, after a few disappointments, may discontinue using the system and look for other channels.

7 - Volume of storage will not be significant for reference information on standards. With less than 300.000 standards with less than 3000 characters per record, the volume of storage remains well below 10^8 characters or below 50 cm bookshelf. (For volume of print see also section 4.6).

8 - Traffic is an essential characteristic. Traffic around standards within one nation could conceivably become so high as to become critical for some national systems. Traffic across national borders constitutes only a small fraction of total traffic around standards and is not likely to become a significant characteristic. If ever peaks in traffic become critical, this will be reflected in the response time.

9 - The construction periods of the systems for the international accessibility of standards are of the order of several months and they have not been a significant characteristic of these systems.

10 - Costs are a vulnerable characteristic of both national and international systems for standards. On

the budgets of standards bodies the expense for an information system has sometimes in the past been considered an item which in years of financial shortage may be cut. The sometimes capricious (Dutch: grillige) financing of standardization in general would perhaps seem to make costs a significant characteristic of the information systems. However, systems like the CICS, NCS and WCS have all brought very modest costs compared to the standardization activity in general. A comparison of these costs, all of them very modest, would overrate this characteristic and would contribute little or no insight to an evaluation of the systems.

To sum up, the following characteristics of information systems will not be further discussed here since they are not so significant for the systems for the international accessibility of standards, that they may be used as criteria for evaluating the systems: reliability, accuracy, life-span, volume, traffic, construction period and costs. In section 6.1.3 the systems will be reviewed for the significant characteristics (i.e. criteria) of maintainability, flexibility and response time, and for a few new criteria suggested in section 6.1.2.

6.1.2 Characteristics not mentioned in section 1.8.

From the description of a number of information systems in chapters 2,3,4 (section 4.5) and 5, the reader, like the author, may have the impression that for an evaluation of the systems, the characteristics mentioned in section 1.8 will not suffice and that there are other characteristics which are significant in a descriptive comparison of the systems. For this reason the following seven characteristics are suggested to supplement the ten of section 1.8:

11 - Coverage is a significant characteristic. It is fundamental to the identity of the information systems and, more important, of the parent organizations. A comprehensive definition of the subject scope of the documents input to the system is significant for the usefulness of the output. See also section 6.1.2.1.

12 - Implementability is a significant characteristic. In section 1.4 it was stated that a design is based, inter alia, on an analysis of the existing situation and that a plan which takes account of the capacity to change, is made to implement the design. A system may be excellent after it has been completely implemented and become fully operational, but the very implementation may be a serious barrier simply because the design of the system has taken insufficient account of the old situation, or the plan has taken insufficient account of the capacity (or incapacity) to change. (Such an information system may be compared to an airplane which could fly perfectly once it was in mid-air, but which will never reach mid-air since it was designed to take-off from the water in a country without water.) When a

system gives some satisfaction even when operating only partially, gradual implementation is possible and, other things being equal, implementability is better than when full operations are required from the start to obtain satisfaction. The nature of the intermediate steps via partial operation depends as much on the situation at the start of operations as on the system to be implemented. In the case full operations are required to obtain any benefits at all, a one step implementation is required. This means, however, that in practice abandonment of the design is preferable.

13 - Accessibility to the user is a significant characteristic. When the user becomes discouraged because standards have been repeatedly unavailable or not easily accessible, he may look for other solutions to his problem: he may look for the standards outside the regular channels of the system or he may make his own standard. In both cases the information system has failed, in the second case at the expense of a vital function of the parent organization. The characteristic here suggested is "accessibility to the user" or "ease of access to the user". It is related to "friendliness to the user" and "adaptability to user mode" (Dutch: inpasbaarheid). It also involves good readability by the user. For international accessibility see section 6.1.2.2.

14 - Compatibility is a significant characteristic of information systems for the international accessibility of standards. It involves internal compatibility between different subsystems for standards as well as external compatibility between communicating independant systems with some common subject coverage. See also section 6.1.2.1.

15 - Salvage value (Dutch: sloopwaarde) is a significant characteristic of information systems for standards. While the construction period is a characteristic relating to the time period before the life-span of the system, salvage value is a characteristic relating to the time period thereafter. Since a world information system for standards, like other information systems, needs to be approached through a process of successive approximations (see UNISIST 1971), the salvage of a system is important for the designers of the next and following systems. Salvage value implies selecting the parts still usable for the next system and throwing away the parts not usable. By making this selection the designer of an international information system learns from the successes and failures of others. This learning is necessary since he may live just long enough to rerun the successes himself but he will certainly not live long enough to make all mistakes himself. The good parts together determine the salvage value of the system.

16 - Impartiality to manual and machine participation is

a significant characteristic of world information systems such as those for the international accessibility of standards, and will remain so as long as one or more participants in the system have to rely largely on processing and communication by men rather than by machines. Impartiability actually means giving priority to the manual participant since those having machines also have hands and heads to work with, while the opposite is not the case.

17 - Language insensitivity is a significant characteristic of information systems involving two or more language groups, such as the systems for the international accessibility of standards. A system operable in one language only may be called completely language sensitive. Introduction of a second language would make reconstructions necessary. A system accommodating all existing languages, including their characters, and treating all languages as equal and not relating to any natural language(s) for parameters (such as alphabetical order of keywords, structure of thesaurus, etc.) or codes (such as country codes, codes for international organizations, languages etc.) may be called language insensitive. Insensitivity to natural languages is an ideal which should be approached as closely as possible in information systems involving two or more language groups among its users.

6.1.2.1 Compatibility with other systems covering (some) standards.

Compatible (Dutch: verenigbaar) means capable of coexistence in harmony.

W. Löhner (1974) defines compatibility as the ability of one information system to accept the original and abstracted products of another information system (for any kind of subject coverage that is common to both systems).

When an information system has decentralized subsystems (as is the case with ISO and its member bodies) internal compatibility is required and may be achieved by internal standards.

When an information system is communicating with other systems (as is the case with ISO, the other ISB's and the IMOSIO's) external compatibility is required and may be achieved by external standards.

Compatibility may relate to hardware, software and programming (Dutch: apparatuur, programmatuur en programmering). Two computers of the same manufacturer may work with the same programme. Two computers from different manufacturers may use the same programming language. Considering the variety of computers from different manufacturers already in use by NSB's alone, the practical possibility to improve the international accessibility of standards by using the same computers or the same programming language seems to be excluded in practice

and will not be considered further in this study.

This study considers in-and-out compatibilities or compatibilities between inputs and outputs, with incidental reference to the problems of the simultaneous user of more than one system:

Compatibility between inputs of two systems exists when the input of each system may be used as input for the other system, with or without previous conversion.

Compatibility between outputs of two systems exists when the output of each system may be merged with the output of the other system, with or without previous conversion.

Compatibility between output of one and input of another system exists when the output may be re-input with or without previous conversion. In this sense a system is not necessarily compatible with itself, since the output of a system is not necessarily usable as re-input for the same system, even after conversion. The conversion may be made by processing in reverse, i.e. by writing the programme backwards, provided the system has no gaps. If the system has gaps, the input can not be construed completely from the output. The missing elements of information may leave the remaining construed input acceptable as such, or may make it unacceptable, in which case the output is not compatible with the input of the same system. An example is the transliteration of Cyrillic to Roman characters.Without special precautions this transliteration has gaps which prevent the reproduction of the original Cyrillic input from the Roman output by applying the transliteration programme in reverse. An example of a system compatible with itself is the WCS, where the machine-readable input may be construed or simply transcribed from the output, provided no information is suppressed.

In section 1.3 it has been shown that the information systems processing standards may be national, multinational, or international, may be limited or general as to subject-fields, may be manual or computerized, and may process standards only or standards among other types of documents. There is no reason to believe that this variety in systems will diminish in the foreseeable future. There will remain for a long time to come national and international standards, manual and computerized systems, and mission-oriented standards-issuing organizations, independent of (though in liaison with) the standards bodies. Reviewing the compatibility of the systems for the international accessibility of standards, there is no point in reviewing the systems of the standards bodies only, or the computerized systems only, or any other group by itself alone, although these limitations are tempting. Limiting the study to standards bodies would largely eliminate the problem of selecting standards from other documents. Limiting the study to computerized system would profit from compatibility and convertability studies done for machine systems in general. On the other hand, not accepting these limitations has the convenience that after even the quickest glance over the different systems one may conclude that, in order to merge bibliographic references to the standards from all these organizations into one master-file, intuitive selec-

tion as well as a number of conversion programmes are inevitable to obtain merged data bases by interchange of inputs, by interchange of outputs or by re-inputing the varying outputs. (See also section 6.3) The conversion programmes should convert bibliographic data bases to and from different file structures, formats and media, and should translate to and from different indexing languages to allow merging into a master bibliographic data base. This will continue to be the case until the concept "standard", its bibliographic description, the information language (classification and descriptors) and other elements of information have been sufficiently standardized as to form and contents in the actual practice of all these organizations. Improvement of the international accessibility of standards may be achieved by (in preferred but flexible order):

- executing the separation function intuitively as long as the concept "standard" varies among the organizations issuing standards
- establishing a merged data base
- standardizing the concept "standard" and other concepts involved in the interchange of reference information on standards
- programming the separation function and the conversions after the standardization of concepts
- standardizing the forms and procedures and reducing the number of conversion programmes until conversions are no longer necessary.

To facilitate the exchange and re-inputing of reference information to standards, one step is to define the elements of information which are or may become pertinent to standards, including the bibliographic description and information languages and to give them a place in the record. Another step is to define a format applicable to each information carrier. The question of the possible standardization of input formats to the extent that the input formats become interchangeable, may be treated in connection with specific information carriers and input machinery or it may be treated irrespective of information carriers and input machinery. Since standards may be filed among other types of documents, the elements of the record and the format should be compatible with the records and formats of the other documents. Standardization of the retrieval languages should have special attention since a lack of uniformity in their use by different organizations or individuals will deleteriously affect their retrievability in merged files.

6.1.2.2 International accessibility to the user

6.1.2.2.1 Two case studies

Case 1: A Russian standard and a Dutch user

In section 4.1 the accessibility of Russian standards to Dutch users was mentioned. The following specific case

from the author's own experience illustrates some practical difficulties encountered.

In an article in the UNESCO Bulletin for Libraries of September - October 1971 R.P. Haritonov describes a number of USSR State Standards which could also be of considerable interest internationally. He refers to one of these standards as "the U.S.S.R. State Standard Informacija o normativno - tehniceskoj dokumentacii (Information on normative technical documentation)".Knowing that enquiries about Russian standards directed to the Netherlands Standardization Institute are referred to the Technical University of Eindhoven, the present writer approached successively the following three information centres for a copy of the standard or a translation of it in English, French, Dutch or German: the Library of the Technical University of Eindhoven, the European Translation Centre (ETC) in Delft, and the ISO Information Centre in Geneva. All three answered that the standard could not be searched on the above-cited information alone. A request by letter in English to the GOST In Moscow brought back the 10-page standard by mail, in the Russian language, with an accompanying letter in both Russian an English. The Russian title of the standard appears to be identical with Haritonov's transliterated title, but the English text on the Russian standard reads: "Information and bibliographical documentation system. Information on norms and standards". The first five words presumably are a variation of the English title of the series in which this standard appeared, which Haritonov elsewhere in his article (which appeared in several languages) referred to as "System of informational and bibliographical documentation" and the last five words would seem to be a variation of the English title. This English translation appears on the third page of the ten-page Russian standard which page is unnumbered and precedes the page numbered "2".

The present writer sent the cover page of the Russian standard to the European Translation Centre and repeated his enquiry for a translation. The translation could not be searched, however, on the basis of this cover page (showing, inter alia, the designation GOST 7.7-69), but only after the data "1969 No 608" from the unnumbered third page had been transmitted. The answer was " no translation located". The same enquiry directed to the Library of the Technical University of Eindhoven was searched on the designation "GOST 7.7-69" and resulted in the same answer. A translation was then made, making the contents of the Russian standard accessible to one Dutch reader (the present writer) of Haritonov's article in the English version of the UNESCO Bulletin for Libraries.

This case illustrates one example of the accessibility of a standard issued by an advanced standards body to a Dutch reader of its citation in a library bulletin of world level, who was acquainted with the international channels of communication for standards. The example raises the question of accessibility to a reader less acquainted with the channels, reading a reference to a standard from a less advanced standards body in a bulletin of less than world scope. Raising this question is answering it: Accessibility is absent or

hardly present. The enquirer may become discouraged before obtaining the information of his interest.

Case 2: A Japanese standard and a Swiss user

(See the note "Standards in action" in the ISO Bulletin included in Normalisatie of Febr. 1973).

A Swiss multinational company operating in Japan was searching for Japanese environmental standards pertaining to test methods for treatment of effluents, and directed an inquiry to the ISO Information Centre in Geneva, Switzerland for the standard(s). From the Japanese catalogue of standards the information centre established the reference to the pertinent standard (JIS/K0102-1964 Testing method for industrial waste water) and requested by urgent cable a copy of it from the Japanese Industrial Standards Committee (JISC) in Tokio, which mailed a copy of the standard to Geneva, where it was translated in part into English by the Japanese liaison officer to ISO and was made available to the Swiss company about 20 days after his inquiry in Geneva. It was received in time to be useful for the decisions to be made for the treatment of the effluents.

This case shows that the Swiss user obtained timely access to the Japanese standard due to the diligence and speedy action of the human functionaries involved. It also shows that the operation of the system could be improved as follows:

- by making the reference information of the Japanese standards catalogue available and accessible to users at the Swiss NSB and not only at the ISO Information Centre.
- by implementing the existing exchange agreements, according to which the Japanese standards, as soon as issued in the original language, i.c. Japanese, should be sent to both the Swiss NSB in Zürich and the ISO Information Centre in Geneva, rather than the English translations which become available months later, if ever. This would have reduced the response time for this inquiry and would have made unnecessary the cable to Tokio and the subsequent mailing of the standard.

This case shows also that even the excellent implementability of the simple exchange agreement does not result in actual implementation.

6.1.2.2.2 Qualified or inexpert users?

The concept "accessibility to the user" raises the question whether the accessibility should be equal to all users. Is accessibility to the inexpert, unsuspecting and unqualified searcher required for all standards? Perhaps not. For standards on very general subjects, like those concerning the calendar we use, equal accessibility to all users, expert and inexpert, is required. But many standards are used mainly by professionals in a discipline or mission. Their first approach is likely to be through the discipline or mission rather than through the standards aspect.

Let us consider for example the maritime field and the field of aviation. In both fields some international standards

are distributed by IMCO and ICAO to the national organizations in each field respectively. Possibly the ICAO and IMCO standards are seldom or never sought by users outside the two missions. When the standards are sought from within the particular mission, then the standards aspect may be used for retrieval within that missionfield as a retrieval tool complementary to the retrieval tools customary within the mission (subject indexes, classifications, etc.). When the standards are sought from outside the particular mission, then the mission aspect combined with retrieval tools customary in the mission may still be used without involving the standards aspect. Alternatively, the standards aspect may be used as retrieval tool within the mission. For example: someone in the maritime field may want to see all standards on nuts and bolts. He may search the field of aviation for nuts and bolts or for standards on nuts and bolts.

A user searching from outside a field may choose to give priority to the standards aspect over the mission-aspect: searching for nuts and bolts in any field he may want to give priority to the standards aspect over a multitude of mission aspects. If he does not, he will first have to list all mission-fields which he will search (in the case nuts and bolts including the construction of ships, airplanes, machines, precision elements and houses) and he may easily forget one. Moreover, he may find the retrieval tools in the different mission fields are not quite the same. In other words: he may prefer a standards channel if there is one. This searcher may be illustrated by a standardizer who is studying the feasability of an universal standardization of direction of movement (in the case of nuts and bolts: turning clockwise resulting in tightening and turning anticlockwise in loosening), who wants to find out whether the direction of movement of standard nuts and bolts in different disciplines and mission-fields is always the same. (For standardization of direction of movement covering all fields, see S. Matuura 1973).

The fact that the ICAO catalogue is distributed free of charge to the aviation branch and is not for sale to interested parties, seems to indicate an expected use from within that particular field only.

A user qualified in his own field is used to the channels in that field and he will meet fewer barriers than the inexpert searcher from outside that field.

In the absence of firm knowledge of the actual and potential numbers of expert and inexpert users, a study of accessibility to the user may sensibly cover both the expert and inexpert user.

In an analysis of sales of standards by NNI (section 3.5) it was seen that standards sold by NNI were sold across the borderlines of branches of industry. Chemical standards were sold not only to the chemical industry, but also to other industries. The same was true for electrotechnical standards. The proportion of sales leaving a particular industry varied however, and was relatively small for ships and aircraft. The analysis showed the buyer of the standard as shown on the invoice, usually an organization which paid the bill. The in-

voice does not show the ultimate personal user(s) of the standard. A chemical standard paid for by an electrotechnical firm may still be used by a chemist working for that firm. The question remains: how many chemical standards are wanted by non-chemists? This question, generalized for all disciplines and missions, deserves further study. If the outcome of such a study were to be that a standard clearly falling within a discipline or mission is needed almost exclusively within that discipline or mission, then the information systems of the disciplines or missions could in principle take care of the information needs of the searchers for these standards, even without using the standards aspect as a complementary retrieval tool. Making a cross-section of field-bound standards from all fields would not then serve any particular need of those qualified users. A cross-section of standards on general subjects, not bound to any particular field, could still be useful to users in general. A cross-section of all standards will be useful to the standardizers, whose need by itself may be a sufficient justification for it.

6.1.2.2.3 Spreading of information

Collecting, storing and making accessible information before it is needed reduces the response time if and when the need arises. It also implies the risk that the information made accessible will never be needed. Waiting until information has been asked for has the advantage that no information is prepared that will not be asked for; it has the disadvantage that at the time it is asked for it may no longer be retrievable or that at the time it is delivered the information may be late or no longer needed. Between a short response time and a low unused storage and processing there may be sought a practical optimum.

A danger in having information ready before it is needed lies in the tendency to distribute information once it is available and perhaps even to force it upon prospective users who do not feel a need for it. The supplier may argue that the user does not yet know what he needs, but that the supplier does! The art is to bring information within reach of the potential user without forcing it upon him. Within reach means that with a reasonable effort from his side the user will obtain the information. To determine his own information need he may have to browse among many data before selecting the information which satisfies his need. The accessibility should pertain to the data to be browsed through in order to determine the need as well as to obtain the information selected to satisfy the need. In the case of standards the accessibility should pertain to all data in all standards and final drafts. In a democratic procedure for adopting standards it should also pertain to early drafts. Acceptance by the standardization committees of a duty to supply information on early draft standards will promote an open democratic procedure.

M. Woitschach (1971, FID Publication 472) shows that the relative value of information in competition decreases, as information is spread. Common interests favour the exchange of information; conflicting interests give information the character of a valuable means for gaining advantage over others.

Access to information is a matter of policy.

Woitschach is correct. His statement relates to the value of information to a competitor to improve his chances to compete in an environment of competition. It is the opinion of the present author that in an environment of international cooperation such as international standardization, the value of information increases when it is not limited, but spread to the extent that it becomes available within reach of anybody who feels he has need for it. The common interests of mankind stand against the conflicting interests of groups. Spreading of information on standards is a common interest of mankind. In case of doubt whether any specific element of information on standards should be included in a particular information service it should be included since, obviously, it is easier not to look at an element of information provided than to look at an element of information not provided.

6.1.3 Qualitative comparison of some characteristics of the information systems of the CICS, NCS, WCS, ISB's and IMOSIO's

In the following paragraphs systems are evaluated from the viewpoint of one interested in standards. This should be kept in mind for those systems which cover standards among other types of documents. For those systems no general evaluation is attempted.

6.1.3.1 The CICS system (chapter 2) was an entirely manual system. Its maintainability and flexibility were good, its actual life-span long (from 1954 until 1971) its implementability very good thanks to the fact that it could function satisfactorily while in partial operation. Its internal compatibility was good and its external compatibility reasonable, its salvage value for a following system was high. Being entirely manual it obviously gave priority to manual processing over machine processing, but there are no reasons why it could not have developed into a mixed system wherein some participants use machines and others do not, without sacrificing the impartiability to both. The response time was reasonable in view of the demands but could have been improved by extending the coverage over draft standards and by periodically distributing centrally merged lists. The actual coverage of the CICS system was not comprehensive, since draft standards and standards from organizations other than ISO and its member bodies were not included. They could have been included in principle. The accessibility to the user was poor: it could have been improved by the liberal distribution of periodical lists. The CICS system was language sensitive and did not even use the possibilities to mitigate the language inequality for those language groups which were not among the privileged.

6.1.3.2 The NCS system (chapter 3) was a national system largely, but nor entirely, computerized, for a national Netherlands catalogue of standards. Its maintainability was rather good, thanks to its modular nature in

the management information system to which it belonged. When other parts of the management information system were abandoned, the NCS could be maintained. Its flexibility was poor, due to limitations imposed by the machines used at its start. The lifespan was short but the salvage value for the following system was high. The implementability was rather good, which made it the first published computerized catalogue of any NSB. Comprehensiveness, within the national scope, was very good and accessibility to the user, in spite of its poor appearance to the eye, was good thanks to the three sequences and a liberal distribution. Response time was rather good. Compatibility with catalogues of other NSB's was poor and language insensitivity was absent.

6.1.3.3. Up to the year 1974, the WCS system had become operational only for the ISO international recommendations and standards, although it had been designed for use by all standards bodies. The following characteristics attempt to evaluate the system as designed for world use. The evaluation is of course hampered by the fact that the operational coverage has been so limited. In particular, any comparison with the CICS system which had a relatively large operational coverage must be made with caution.

The WCS system as designed has good maintainability, flexibility, comprehensiveness of coverage, implementability, accessibility to the user, and language insensitivity for languages with a Roman alphabet. Languages with other alphabets had to be transliterated. The system's internal compatibility was good and its external compatibility reasonable, although both obviously depend on the other (sub) systems as well, most of which were in the process of changing. The system is impartial to manual and machine processing: hand-written worksheets could be made machine-readable by a central service. The catalogue and the keyword list of the dual dictionary type allowed manual searching. The systems salvage value for the following system should be high, but dependent on the ultimate extent of its operations.

6.1.3.4 The IEC system is entirely manual. It has good maintainability, flexibility, response time, implementability, accessibility to the user, and salvage value. Its coverage is limited to the electrotechnical field and not comprehensive in a wider sense. Compatibility is poor but not poorer than that of most other systems. Language insensitivity is absent.

6.1.3.5 The systems of IBWM, IOLM, ITU, ICAO, IMCO and WMO are all manual systems, covering other documents beside a very limited number of standards, presumably in each case below one hundred. As said before, in the present study, the attention is focussed on the standards and a general evaluation is not attempted here.

Maintainability, flexibility, response time and implementability are good, as may be expected for

small volume manual systems. Comprehensiveness of coverage of standards is not attempted. Accessibility to the user of standards is poor, mainly due to the fact that the term standard has different meanings and, moreover, is not or scarcely used as an entry. Compatibility with other systems is poor. Language insensitivity is absent.

6.1.3.6 The IAEA-INIS and FAO-AGRIS systems are related, AGRIS level one having been derived from INIS. Coverage is limited in both cases to each particular mission. It is not limited to publications of each particular organization, but is comprehensive within the mission. In the case of FAO-AGRIS this means a wide coverage and high volume of storage. The systems cover some standards and many documents other than standards. The two systems have good maintainability, flexibility, response time, implementability, good internal compatibility within each of the two systems, and poor compatibility with other systems covering standards. INIS and AGRIS define standards differently on their working sheets (see section 5.2.5) and are not mutually compatible on this point.

When the present INIS and AGRIS systems are replaced by the next system, their salvage value will be extremely high. The impartiality to manual and machine participation is reasonably good, although a priority of manual participation is not apparent. Accessibility to the users in the parent organizations, IAEA and FAO, is very good. To users of standards outside these organizations accessibility is not quite so good. Language insensitivity is absent in INIS, which uses English as working language, and is poor in AGRIS.

6.1.3.7 The WHO system, including MEDLARS, has a coverage limited to the mission of the WHO. Maintainability, flexibility, response time, implementability and salvage value are good or reasonable. Accessibility to the user of standards outside the mission-field of health is poor. Internal compatibility is good, external compatibility as regards standards is poor. Impartiality to manual and machine participation is not apparent. Language insensitivity is absent, the working language being English.

6.1.3.8 The ISIS system covers social standards and some technical standards among many other documents. The scope of the technical standards proved difficult to detect for the present author. Clarification of the scope of the technical standards is a first requirement for making the system compatible with the other systems covering standards.

The ISIS system has good maintainability, flexibility, implementability, good internal compatibility. Thanks to its catalogues and indexes which are meant to answer questions before they arise it has very short response time. The accessibility to the user outside the ILO is hampered by the fact that the

computer-produced current awareness list is for internal use only. The salvage value of the technical standards aspect is very low.

6.1.3.9 Salvage values combined

The table in section 6.1.3 has summarized the strong and weak points of the systems. After a review of the systems in the light of the characteristics chosen, what features of which systems may most advantageously be combined in successive future systems for the international accessibility of standards? The author recommends that anyone attempting to answer this question should pay attention to the following features.

In order to improve maintainability and flexibility a modular design is preferable: each element of information liable to change should be structured so independently relative to the others that it may be modified by itself without affecting the others.

The response time for issued standards may be improved by inclusion of draft standards. The accuracy for issued standards may also be improved by inclusion of draft standards, allowing corrections on most elements of information before the standard is issued. The response time and accuracy may also be improved by inclusion of draft revisions of existing standards among the draft standards.

Coverage may be made more comprehensive by standardization of the concept "standard" among the standards issuing organizations and by defining the scope of the system in terms of subject coverage of the standards network. Recognition of standards as a type of document among other types such as patents, theses etc. will be helpful. The system should include a referral to other sources of normative instruction such as regulations, laws, conventions etc.

Implementability and impartiality to manual and machine participation may be enhanced by offering optional central assistance in preparing readable input.

Accessibility to the user may be improved considerably by harmonization of catalogue records on standards, as was attempted in the WCS design. A world catalogue of standards may function as a central subsystem in a network of information centres for standards. Most promissing is a combination of decentralized preparation of input (as in CICS, INIS, WCS and AGRIS) to achieve accuracy of input, and centralized merging and distribution (as in ISIS, INIS, WCS and AGRIS) for improved accessibility to the user.

External compatibility will require continued participation in the development of a world science information system by UNISIST. To facilitate liaison with other international organizations on the daily working level it is recommended that the U.N. International Computing Centre be used rather than a commercial computer centre.

To give priority to manual participation where no machi-

Table

Warning: this table schematically summarises the evaluation of the systems for those who have read section 6.1.3. It is not meant to be used by others.

+++=very good ++=good +=rather good -=poor NR=not relevant

Evaluation of systems

Characteristic \ Organization	CICS	NCS	WCS	IEC	IAEA+ FAO	ILO	WHO	IBWM IOLM ITU ICAO IMCO WMO
maintainability	++	+	++	++	++	++	+	++
flexibility	++	-	++	++	++	++	+	++
life-span	+++	-		++		++	++	+
response time	+	+	+	+	++	++	++	+
comprehensiveness of coverage (as regards standards)	-	++	+++	-	-	-	-	-
implementability	+++	+	++	+++	+	+	+	+++
accessibility to the user	-	+	+++	++	+	+	-	-
compatibility, internal (as regards standards)	+++	NR	+	NR	+	+	+	NR
compatibility, external (as regards standards)	+	-	+	-	+	-	-	-
salvage value	+++	++	+++	+	+++	+	+	+
impartiality to manual and machine participation	+	NR	+	+	+	+	-	+
language insensitivity	-	-	+	-	-		-	-

nes are available with simultaneous impartiality to machine participation where machines are available, a card index similar to that of the CICS may be created on a card carrying a somewhat larger number of characters and distributed as a form of centralized output to be readable both manually and by machine. The cards should contain the entire catalogue record of one standard, plus a short abstract when available.

To approach language insensitivity the pertinent features of the WCS system should recieve attention.

The standardization committees constitute an entry to channels of information leading directly to the sources of formal standardization offering the possibility of observations from and messages to the planning stages of standardization work. An information system for standards may better serve the vital functions of the standards body when the design of the system has taken into account the planning of the standardization committees. The designers of the information systems for standards should obtain insight in the methodology, if any, of the planning of the work of the standardization committees. Using this insight the information systems may be designed to interact with the planning in order to improve service to the vital functions of the parent organization. One example of interaction with the work of the standardization committees is the inclusion in the catalogue of a sequence by technical committee, as was done, inter alia, by NCS and WCS.

Destandardization should be treated in the information systems for standards as an event equally important as standardization. Withdrawals and revisions of standards are equally important as original or new standards.

6.1.4 Potentiality and reality around characteristics

According to the ISO definition (section 1.2) standardization is the process of formulating and applying rules .... etc. Formulating rules creates a potentiality, applying rules a reality. It is noticeable that the distinction between potentiality and reality has not been consistently made in the standardization literature. (Nor does the dissertation claim consistency on this point.) If it had, the word "standardization" would be reserved for changes in the real world, e.g. for the change of papers from any size to standard size. The formulation of a standard for paper sizes, does by itself not change any paper size in the real world. Even the standard itself could still be printed on off-standard size paper. But it provides a step towards standardizeability (or ease of being standardized) of paper sizes, by formulating the standard sizes. Another step is the provision of accessibility or the offering of access to the standard. From this viewpoint the standards bodies prepare for standardization and provide for standardizability by formulating standards and providing accessibility. Whether access and standardization will follow, depends on others.

The title of this dissertation is not "Information systems for international access to standards" as it could have been, since this title may suggest that the information sys-

tems result in access to standards, while actually this is not necessarily the case. They offer access by providing accessibility (or ease of access). This offer may or may not be used and therefore may or may not result in access. Accessibility indicates a potentiality, access a reality.

The implementability of a system may be good and the system still not be implemented. The maintainability may be excellent and the system may still not be maintained. The salvage value of a terminated system may be high and the salvage not used. Convertibility does not mean conversion. Exchangeability is not the same as exchange. Accessibility is not access. Compatibility garantees no coexistence in harmony, no interconnection, let alone compassion. These characteristics indicate potentialities which may or may not be realized.

The developments in the reality around international information systems for standards seem to depend also on other things like the recognition (or lack of recognition) that an information system does (or does not) contribute to the vital functions of the parent organization, and the satisfaction in giving enjoyed by the national contributors to the systems.

Characteristics like construction time, implementability, maintainability, compatibility, accessibility and salvage value should be considered in connection with the national satisfaction value and possibly in connection with other qualitative characteristics less common in the evaluation of information systems.

6.1.4.1 National satisfaction values

The national satisfaction of making an international contribution may work in favour of systems which are substantially dependent on national contributions, each honoured by immediate recognition. It may work against systems dependent on contributions not identifiable as coming from any national body in particular.

This applies to agreements required for adopting international standards: Let all countries adopt the .....(the reader is invited to fill in the nationality) national standards, which are the best! It equally applies to the agreements required for international management information systems, including international documentary information services.

In a decentralized system, such as an information network without central processing, all contributions and messages are identifiable as coming from a particular country and have some national satisfaction-value for that country. In a system with central processing functions, the output is not or is less easily attributable to any country in particular and will not result in anybody's national satisfaction.

NSB's using computers for processing information on standards happen to have computers manufactured in their own country, when available. They are willing to let other NSB's benefit from the presence of their computers, and they enjoy national satisfaction in so doing. Similarly, in a more sophisticated way, the willingness to make available software develop-

ments and other creative work for use internationally, is apparent as long as international recognition of the contribution made is expected to yield national satisfaction.

A pragmatic preference for systems appealing to national contributions however does not fully exploit the possibilities of international cooperation. International standardization in general and information systems for standards in particular may become more powerful tools for international cooperation provided the standardizers continue to grow in solidarity not only beyond national interests but even beyond national satisfaction-values. International systems based solely on the national interests and satisfactions of the participants are of limited usability for cooperation on a world scale compared to systems also relying on international solidarity.

6.2 A FEW CITATIONS

Following are a few citations of interest to the subject of international information systems and networks.

6.2.1 UNESCO/ICSU (1971). The following quotations from the UNISIST report seem of interest to the present study:

Page 63: "... that the overall function of information systems was to give all users equal access to the world capital of scientific an technical knowledge, irrespective of their contingent relations to particular socio-cultural or professional subsystems."...

..."...the mere fact that information systems such as CAS or INIS are meant to serve primarily the need of specific user-groups, through existing professional structures, implies that anyone outside these groups or structures may be at a disadvantage in gaining access to the system."

Note: This disadvantage applies to some of the systems of the present study: ITU, IAEA-INIS, FAO-AGRIS, WHO, ILO-ISIS, ICAO, IMCO and WMO.

Page 67: "Horizontal integration entails exchangeability and sometimes interchangeability: the basic principle is that the output of each phase of information transfer is made available to other services which need it as input to their own organization. It follows that output/input compatibility or convertibility of information systems, at some or all phases of processing, is a sine qua non condition of horizontal integration within regional, disciplinary, national or any other network. The requirement of compatibility is the stronger of the two: the products are then immediately interchangeable, e.g. library's catalog on tape may be read into a re-processing centre's computer, for the purpose of compiling an index journal, etc. With convertibility, some intermediate transformation is needed to make the product of system S_i acceptable to system S_j, for instance, transliteration, re-encoding, etc. The important point is that standards are required in both cases, to restrict behavioral choices to a set of alternatives which have been so arranged as to permit formal conversions or interchanges".

To achieve compatibility and convertibility, standards are needed in the following areas indicated in the UNISIST report:

- all elements of bibliographic description
- abstracting
- indexing (classifications, thesauri)
- information-carriers (books, cards, microfilms, punched cards, punched tapes, magnetic tapes, etc.)
- machines (records, programming languages, character sets, etc.)
- library statistics.

Page 78: "What is ....needed is ...a coordinating mechanism established for the purpose of collecting data on the standards proposed or used in developing systems, and suggesting adjustments that would facilitate immediate or future interconnections..."

Page 99: "The long-term goal is to provide individual users in all locations with comparable conditions or remote access to scientific information, by means of local dispatching centres connected to one another through appropriate media"...

Page 122: ..."that the implementation of machine methods should not be given an absolute priority, to the detriment of the more basic services ..., which can still operate efficiently without them. A more urgent duty is to secure the observance of accepted international standards, in the earlier and more elementary processes of information transfer (cataloguing, abstracting, indexing etc.), so that the products of document analysis in the various systems that are to make up UNISIST will be directly acceptable as input to the national library systems of developing countries."

Page 133: ..."three headings, which denote the major problem areas to which UNISIST is addressed, and the essential facets of this project from a functional viewpoint: (a) the availability and accessibility of scientific information, with a special emphasis on the difficulties arising from objective differences between more or less developed countries (...), (b) the connectibility and compatibility of information systems, (...); (c) an increased selectivity and flexibility in the handling and distribution of scientific and technical information, (...)."

6.2.2. D.B. Baker, P.V. Parkins and J. Poyen (1972) in their contribution "The future of access services" to FID Publication 478 observe the developments of information sub-networks like INIS, MEDLARS and CAS, in which local services are responsible for covering the local source literature and sending the information to a central processing unit, and receive in return the publications and services from the central unit for searching purposes to answer the questions for their users. They mention the problems to be solved before such sub-networks can be put into full operation: standards, definitions of coverage, editorial, and format policies, etc., so that the information which the central service receives from its local partners is fully compatible with the specifications and requirements of the system. When standards are adopted within

each information sub-network separately, they will be different from each other, and further coordination is required to achieve a major improvement in the over-all access to the system for the long-range future.

6.2.3 F.W. Lancaster (1972) discusses the international compatibility and convertibility of controlled vocabularies: The availability of bibliographic data bases in machine-readable form provides the possibility that any information centre may integrate portions of external data-bases into its own processing activities. In combining machine-readable data from multiple sources (and in multiple formats), one of the problems involved is that of diverse vocabularies. Among the factors promoting compatibility are given:

- the modelling of vocabularies on pre-existing thesauri
- the emerging of thesaurus rules, guidelines and conventions
- the use of standard software packages in thesaurus construction, leading to compatibility of formats for storage of thesaurus data in machine readable form.

Where an international relationship exists between information centres, as in an international network, a multilingual thesaurus may be used. Lancaster refers to Loyd for the use of the UDC as a standard switching language with which each vocabulary can establish a single concordance. This may be required if information centra in an international network were reluctant to abandon thesauri already in use.
Lancaster also describes the use of a controlled vocabulary for indexing and searching in the on-line mode of computer operation. In the on-line mode the searcher, via some type of terminal, has immediate access to the data base and can interrogate it directly, structuring his strategy at the terminal, receiving responses from the system (including the number of citations matching his terms), and modifying the strategy on the basis of the responses received. The indexer at the terminal, may key-in a term and request displays of the term in several contexts: alphabetical (between alphabetically adjacent terms), hierarchical (between broader and narrower terms), cross-referrenced (between terms referred to and referred from) and permuted (all descriptors containing the term). The vocabulary-control itself may also be assisted by the on-line mode of operation. An entry-vocabulary may lead the user to the correct term, starting from alternative word sequences, spelling variants, abbreviations, common misspellings etc.

6.2.4 J.O. Ott (1974) reports that C.E. Shannon in 1959 distinguishes five elements in every communication process, i.e. source, sender, channel, receiver and destination, and he applies this distinction to reference retrieval in general and in particular to a few international documentation pools (i.e. the international cooperation for supplying literature data in a particular discipline). The acquisition and selection of documents are done in the participating countries. The analysis and bibliographical description of the documents, the abstracting and indexing are also done in the participating countries, according to strict rules, using uniform input forms. The storage of the index-records and the retrieval of the documents in the file are done by the central agency. The mailing of documentation bulletins, the determination of interest or question profiles, the mailing of searches by subscription (current awareness), the analysis and indexing of questions

asked by users and the mailing of the answers are performed by the central agency.

6.2.5 A.J.N. Judge (1972) (see FID Publication 506, pages 128-131, 1974) reports that the term "network" can be used in a variety of ways and gives a list of 13. He also reports 10 consequences of a network concept.

6.3 INFORMATION SYSTEMS IN A MANAGEMENT STRUCTURE

In this section a few concepts are selected from G.C. Nielen "Information systems in a management structure" (1972), and applied to the field of national and international standardization.

A NSB, ISB or IMOSIO is an authority controlling comprehensively, either exclusively (in the case of the standard bodies (SB's))or among other things (in the case of the IMOSIO's) sets of aspects (i.e. the attributes of state and of event) pertaining to national or international standardization. The NSB's exercise control within their own country, the IMOSIO's within their own mission, and the ISB's collectively without apparent limitation. The basis of the authority of the individual NSB, ISB and IMOSIO differs widely: it may be the authority of an independent institute or a federation or it may be the authority of a small section of a government department or it may be a major government department. In each case however the authority controls sets of aspects which may be considered as modules (G.C. Nielen, 1972, pages 9-20 and 61). Together the NSB's, ISB's and IMOSIO's may be considered as a management structure, i.e. the finite set of modules that contains all aspects of state and event pertaining to standardization. Changes in this management structure would mean re-allotment of aspects over the modules.

The management information system of a NSB, ISB or IMOSIO is a steering system used for the comprehensive governing of their module.

Information systems of NSB's, ISB's and IMOSIO's, having no common subsystem, may be called isolated systems (G.C. Nielen, 1972, pages 62-64). When isolated systems need each other's data, one system presents (outputs) a message and the other receives (inputs) that as an observation. Translation of observations and messages is required when they use specific terminology and specific forms for messages. Translation may involve conversion of terms, forms and formats. When concepts differ, translation is impossible.

A steering system of a NSB, ISB or IMOSIO may have a manual or automated specialized subsystem for reporting, storage, retrieval and communication of documentary information (i.e. information about documents). This information may involve facts from the documents, the documents themselves, references to the documents or referral to addresses where (more) documentary information may be obtained.

As to the nature of documents processed in the specialized subsystem for reporting,storage, retrieval and communication of documentary information there is considerable dif-

ference between the individual bodies and organizations (see also section 1.3).

- Most NSB's process national standards issued in their own country, usually issued by themselves, and very few documents other than standards (exeptions include the BSI Technical Help to Exporters which also largely covers standardizing legislature). By agreement with ISO and IEC, and, by agreement among each other, NSB's sell ISO and IEC standards and national standards of other countries as sales agents for each other . Selling implies supplying the document and providing sufficient reference information to be able to accept an order for it.
- ISO processes international standards and recommendations issued by ISO, stores national standards of NSB's, and processes information on national standards of NSB's. Very few documents other than standards are involved in this processing.
- IEC processes international standards issued by IEC. Very few documents other than standards are involved in this processing.
- IBWM and IOLM publish their own international standards and recommendations, which are rather limited in number.
- all IMOSIO's process documents issued by themselves, including international standards and related documents, among many documents other than standards. Some IMOSIO's process documents issued by others within the field of their mission, including standards among many other documents.

The specialized subsystems for reporting, storage, retrieval and communication of documentary information of the individual NSB's, ISB's and IMOSIO's are subsystems of steering systems having different functions for separation of useful and useless data. For a standards body (SB) the fact that a document is a standard is essential, for an IMOSIO it is not. The difference in separation function between the IMOSIO's on one hand and the SB's on the other hand is related to the aims of the organizations and is permanent in nature. Therefore the steering systems of the IMOSIO's cannot share a common subsystem with the SB's. When modules must be independent, their steering systems must be isolated (G.C. Nielen, 1972, page 63). IMOSIO's and SB's can not integrate their systems since the SB's will always have to apply their own separation function to messages received from IMOSIO's, and vice versa.

The steering systems of SB's and IMOSIO's must remain isolated and may communicate only in the way isolated systems communicate: the steering system of a SB will observe a message from an IMOSIO and will separate data as useful or useless on the basis of contents of its own module. Data accepted as useful may still have to be translated.

Although the isolation of the steering systems of SB's and IMOSIO's may not be broken by integration (i.e. by use of common subsystems), it may be mitigated by standardization and use of computers: separation involves the question: "Is the document a standard or related normative document, yes or no?" Standardization of the concept "standard" as used in NSB's and IMOSIO's is necessary for communication. The isolation may thus be mitigated by standardization of the concept "standard" and may further be mitigated by standardization of

terms and formats and by use of computers for exchanging and processing the data.

While an Integrated Reporting Communication and Storage Subsystem (IRCSS) for documentary information on standards cannot be common to an NSB and an IMOSIO, an IRCSS for documentary information on standards, common to one or more NSB's and one or more ISB's should in principle be possible, since the aims of these bodies do not exclude the possibility that they all use the same separation function for useful and useless data as regards documentary information on standards. Common use of the IRCSS does not require integration of any other part of the steering systems. In fact integration of prognostication and decision-making is excluded as long as NSB's and ISB's are independent of each other.

Between the SB's the concept "standard" has been standardized already on paper and a standardization of terms and formats is ready or well under way. An IRCSS for documentary information on standards serving all SB's is conceivable within the presently prevailing allotment of aspects to modules (i.e. within the present management structure), and between the currently existing steering systems of the modules(i.e. the information systems of the SB's). This IRCSS does not contain the standards of the IMOSIO's, which remain isolated from the SB's. These documents may be communicated as messages from an IMOSIO to the IRCSS for separation. This separation of standards (including related documents) and other documents will remain a difficult, unprogrammable function to be performed by human judgement or intuition until the time when the concept "standard" has been standardized de facto among SB's and IMOSIO's. This time may never come, although attempts are being made in this direction (See UN - ECE. Definitions, 1974).

A possible integration of the steering systems of the IMOSIO's, by use of a common IRCSS among themselves (if feasible in view of the dependence or independence of the modules) may facilitate the observation of messages from the IMOSIO's by the IRCSS of the SB's to the extent that it reduces the translation programme. A prerequisite to this translation is the de facto standardization of concepts,not only within the group of SB's and within the group of IMOSIO's but over these groups. The standardization of terms and formats over these groups could facilitate the communication by reducing further the translation or conversion programmes.

The information system for a world catalogue of standards (WCS, see section 4.5) may be considered part of an IRCSS for documentary information on standards.

6.4 SEPARATION OF STANDARDS FROM OTHER DOCUMENTS

A selection of the documents considered as standards from the other documents issued by the same organizations is required before the reference information to the documents may be merged into a comprehensive master file of reference information to standards. This separation of useful and useless documentary information is an essential function of the information system. It belongs in a steering system and it makes integration (not communication) impossible with stee-

ring systems having different separation functions. (See section 6.3). In fact there is considerable difference between the documents considered as standards by these organizations, and the way standards are introduced into their information systems is quite different also, as was discussed in chapter 5.

To obtain a comprehensive master file of standards by merging the pertinent outputs of these diverging systems a careful check must be made of the output of each system before admitting it as re-input in the merging programme. The nature of the document must be checked as being a standard. This qualitative check is to be performed by man rather than by machine. In view of the existing divergencies of definitions (expressed or implied) among the organizations, an intuitive function is involved. A conversion programme should first of all be a selection programme. As long as an indication is somehow given on the input format that the document is a standard (by identification code, as keyword, as literary indicator, as type of document, or otherwise) it will be possible to derive from this indication combined with the source of input format (FAO, ILO, IAEA, ISO herself, etc.) a conclusion "document to be in/excluded in the standards list". This conversion programme would, however, select documents as standards on selection criteria specified differently for each source. Therefore identification of the source is at all times required. The conversion programme may further transcribe the elements of information which are required for document identification. To avoid the possibility of overlap of existing codes, the identification should be preceded by the identification of the source (FAO, ILO, IAEA, etc.) even when this would mean redundancy for many identification codes. The other elements of information may be transcribed when of interest.

A definition of subject-scope comprises a standardized definition of the concept "standard" for each identified source. However, due to the different meaning given to the concept "standard" any list of standards obtained by automatic selection of documents and transcription of elements of information as described above, will contain standards of different nature, of interest to quite different user-groups. A selection will require non-programmable intuitive judgement per document applied by man until, after standardization of the concept "standard", the selection may be programmed and may be made by machine. Standardization of the concept standard for the purpose of programming will involve at least uniform definitions i.e. verbal descriptions for different types of standards (possibly corresponding to different sources or user-groups), and ideally one universal uniform definition for all types of standards. If these definitions of different types of standards were generally accepted, it would be most efficient to introduce the definitions into the instructions for input for the individual systems, which would make the separation functions of these systems the same in this respect. The programme could then be extended to a programme for selective dissemination of information, offering each type of standard to its own group of interested users.

6.5 THE CENTRAL AGENCY IN AN INFORMATION NETWORK FOR STANDARDS

The following functions will be considered central in nature and in the following sections it will be shown that these functions may preferably be performed by a central agency.

- merging of reference information (section 6.5.1)
- designation of UDC numbers (section 6.5.2)
- keeping a thesaurus of descriptors for standards (section 6.5.3)
- establishing and maintaining a concordance between UDC and thesaurus, both for standards (section 6.5.4)
- interactive question-answer service by telecommunication (section 6.5.5)

6.5.1 Merging of reference information

Merging the standards catalogues of national and international standards bodies and the references to standards adopted by mission-oriented international organizations issuing standards among other documents, will facilitate searching across these organizations for the user who is not acquainted with the scope of each of these organizations. This merging is a central function in the sense that it requires communication with all systems contributing output which will be input for the merging. (It also requires separation). For merging data from all systems in the network, there must be at least one system containing at least one subsystem communicating, directly or indirectly, with all other systems. The function of this subsystem may be called a central function, even though this same function may also be performed by other subsystems in other systems in the network. In other words: this central function may be replicated at different locations and still remain central in nature.

In principle anybody could do the merging. Even in the old situation of widely divergent catalogues of standards and widely divergent catalogues or lists of publications of IMO-SIO's, anybody could order or borrow all these catalogues and lists and manually merge them for own use, applying an intuitive separation function, into one or more sequences, without even a need for asking permission to do so. A great deal of effort would be required due to the lack of consistency in the elements of information, and the benefit would become belated due to the time-lag between issuance of the standards and completion of the merged sequences. But, in principle, it could be done by anybody. Taking the elements of information directly from the standards when issued would shorten the time-lag but would also require even greater effort.

The fact that performing the central function of collecting reference information to standards as input for a merging operation requires communication with the systems of the network, does not mean that the party performing this central function exercises control over the systems. (Dutch:...betekent niet dat de instantie die deze centrale functie uitoefent, deze systemen bestuurt, regelt of beïnvloedt). This remains true just the same when the merging is performed by just anybody manually collecting and merging reference information from catalogues, or by a participant in a network for exchanging index cards such as the CICS system (Chapter 2), or by a

participant in a modern automated network for exchanging machine-readable information by telecommunication. This particular central function depends on the systems for obtaining input, but has no control over them. The central function does have control over the nature of its own output, within the limits set by the input received, and it has essentially complete control over the distribution of its own output, which may be strictly for its own use, or for a selected circle of friends, or for the systems having contributed input, or for those willing to pay a profitable price, or for just anybody (compare section 6.1.2.2.3 Spreading of information), or for a group defined in any other way.

A central subsystem for merging documentary information, even when it happens to be an integrated reporting, communication and storage subsystem (IRCSS), serving many systems, does not need to control the participating systems, although the operation could possibly be streamlined by central control. Central control is an alternative to cooperation as a means of setting the standards required for an effective operation. If the central module prescribes and controls the standards required for exchange of the reference information, this will streamline the operation, provided all participating systems indeed gently comply by conforming their output data to the centrally prescribed standards. It may be emphasized that standards adopted centrally by mutual agreement and consensus between all those in charge of participating systems will serve the same purpose as standards centrally prescribed. If these standards are strictly limited in scope to what is essential for the communication and merging, their application will be an inherent demand of the operation itself. In an automated merge the computer programme would have to reject input not conforming to these strictly limited standards.

In a communication network for exchanging standardized reference information on standards, from the day of issuance of the standards, the effort and the time-lag may be greatly reduced (compared to the high effort and long time-lag of the non-standardized case above) and the benefits obtainable from the merged sequences may be further enhanced if the elements of information are indeed provided consistently in accordance with the standards. If all the standardized reference information is supplied in machine-readable form the average timelag between the issuance of the standard and the completion of the merged sequences may be further reduced. The consistent provision of all essential elements of information of the references, in machine-readable form, are essential for these advantages and any lack of consistency should be amended, by the system outputting the data or as an additional central function of checking and correcting prior to admitting the data as input for the merging.

When systematic inconsistencies in the reference records no longer exist (incidental errors will always occur), merging as a planned central function assigned to a central international agency, such as the ISO, may have advantages and disadvantages compared with merging as an incidental dispersed function of a variety of national organizations.
Advantages are:

- the central operation will allow the employment of specialists at one place, too costly to be employed at several places
- a computer programme may be made for the central agency and may there be equally available to organizations wanting their own (intermediate or final) catalogues to be made directly in the agreed form in any of the available sequences
- the merged sequences may be made and issued at fixed and relatively short intervals
- the merged sequences may be distributed to answer questions before they arise and to help searchers to formulate individual search questions more specifically
- when the function is performed centrally at the site of an international organization, then the principle of equal access may be diligently guarded; inadvertent discrimination in priorities of work, use of languages, facilities for payment, etc. may be more easily avoided than when this function is performed in a decentralized way at the sites of national organizations. Note: About equal access the UNESCO/ICSU report on UNISIST (1971) says on page 116: "The concept of equal access to Scientific and Technical Information (STI) would seem to imply, among other things, that the same service be delivered on comparable terms to all users, irrespective of the geopolitical attributes of supplyers and buyers."

A disadvantage is:

- whenever national aspirations are a more potent motivating force for financing information projects than the aims of international cooperation, the larger amount of money required for dispersed national operations will be more easily obtainable than the smaller amount of money required for a cooperative international operation.

The task of reaching agreement between standards bodies as to standards required for harmonizing and improving their own information systems, should not necessarily be considered an easy one. The standards required are, so to speak, at the company or branch level, for use in its own house by the family of ISO organizations, until official standards become available at the international level. There is a tendency to wait for the latter which of course form the main objective of the ISO. (See also sections 4.4 and 4.8 and 5.2.4 under INIS Terminology and codes.) The desirability of official standards is accepted and needs little propagation among standardizers. But to tell standardizers to standardize their own house-operations is like telling accountants to keep books: it is good for every pupil and client, but the master himself has risen above the need for it. Only official standards will be observed by standardizers as part of their educational task. Otherwise the factors influencing an individual to prefer his own design over a standard (section 1.6) apply to standardizers as they do to other individuals.

So far in this section the central function of merging reference information to standards has been discussed with reference to the national standards bodies, Member Bodies of ISO. However, they constitute only part of the environment relevant to this study. ISB's other than ISO issue standards. Mission-oriented international organizations, non-members of

the ISO, having liaison with ISO, also issue standards (Chapter 5). With the exception of the IEC, they are not ordinarily involved in any agreement ISO Member Bodies may reach concerning the exchange of information on standards. Again with the exception of the IEC, their standards are among many other documents issued, and are difficult to isolate from those by the inexpert searcher. The meaning of the word standard varies among these organizations. Their information systems treat them differently. As long as these circumstances prevail, a human, intuitive, non-programmable separation function, including an analysis of contents, to select standards and related normative documents, before accepting their outputs as input for a programme of merging reference information on standards, is indispensable. (See section 6.3 and 6.4). This function, preceding the function of merging, is preferably a central function, in order to guarantee consistency, and also to obtain cooperation from the IMOSIO's.

6.5.2 Designation of UDC numbers to standards

The need for centralized control of UDC numbers for standards has been shown by H. Wellisch in 1969 and has been discussed in sections 2.3.6 and 4.4.

6.5.3 Keeping a thesaurus of descriptors for standards

The need for the development of a thesaurus of descriptors for standards by the ISO Information Centre was discussed in section 4.4 (see also sections 2.3.3 and 2.3.11.2).

6.5.4 Concordance between UDC for standards and thesaurus for standards

H. Wellisch in 1969 noted that no attempt had been made to use the CICS system as the basis for a subject concordance to the world standards (See sections 2.3.6 and 4.4 and 4.8.2).

Should the switching between the UDC for standards and the thesaurus for standards be controlled centrally? The development of a standardized information language like the UDC or a thesaurus to be used for standards storage and retrieval requires (like standardization in general) decisions at a central point. Therefore both UDC and thesaurus for standards should be developed as a central function. The effort required to achieve standardization of the UDC designations for standards may be of approximately the same order of magnitude as the effort required to achieve standardization of the designation of keywords in a thesaurus. Reviewing the developments around the CICS system (Chapter 2) and the conception of the ISO Information Centre (Section 4.4), as a matter of hindsight, one may ask whether the standardization of UDC usage for standards in a system already in operation and based on (insufficiently standardized) UDC, such as the CICS system, would not have been more readily obtainable than the setting up of a new system to be based on a thesaurus still to be made, the usage of which will require standardization just the same. A choice between UDC and thesaurus, both for standards, may possibly be made on grounds outside the information and documentation systems of standards bodies, such as the compatibility with other information systems, and the work which

may be (or may have been) done by others: UDC by FID committees and thesaurus by using existing thesauri. For a critical investigation of UDC, see H. Arntz in FID Publication 405 (1971).

There are advantages, however, in not making a choice between UDC and thesaurus and making both available to the user. The user may then choose the one he knows best, or, if he knows both, he may find out whether they give the same results in terms of standards retrieved. Making a choice between UDC and thesaurus assumes that in either case all standards bodies participating would in fact use the information language choosen. In past years some have followed the recommendation to include UDC on their standards and others have not. If no single information language is used by all, the creation of a switching mechanism will be indispensable.

A Subject field Reference Code (SRC) related to the UDC is being developed by the FID. For a review see A. van der Laan, 1974. The SRC has been suggested as an international switching code. Within the UNISIST framework it is being used for developing a Broad System for Ordering knowledge and information (BSO). In an international network of information sources the BSO may be used for tagging of subject fields to facilitate identification and interconnection of sources (systems, services, centres etc.). Within each broad subject field a standardized vocabulary may be developed in each language. Early in the year 1975 a preliminary list of candidate subject fields for the BSO (UNESCO/UNISIST 1975) showed approximately 2000 candidate subject fields, devided over 76 major subject fields, grouped in 9 areas. The candidate broad subject field "Metrology" is found under the main subject field "Investigation techniques" in the area "General, formal and structural sciences". Under "Metrology" one reads "Measurement principles, units, constants, etc." and "Systems of weights and measures". Similarly, the candidate broad subject field "Basic methods and techniques in technology" is found under the main subject field "General engineering and technology methods and equipment" in the area "Technology". Under this broad subject field one reads inter alia "Technical standardization". At this place the standardization thesaurus could be fitted in. It is noteworthy that this preliminary list of candidate broad subject fields for the BSO does not by itself show the richness of subdivision for standardization shown by the recent additions of the UDC under number 006 (see section 6.6.1). For detailed subdivision it appears to rely on existing information languages like the UDC and thesauri. This preliminary list would not make unnecessary a switching mechanism between different information languages used within the broad fields, in this case between UDC and thesaurus used for standardization. Given the fact that both UDC and thesaurus are in use by a part of the standards bodies, this switching mechanism is indeed required for communication. Fortunately, since most standards belong to disciplines found in the BSO, the detailed switching mechanism may take the form of the BSO.

If the UDC for standards and the thesaurus for standards are both sufficiently developed, they may give the same result in the sense that they both may give a 100% recall of pertinent standards, perhaps with varying precision (Dutch: relevantie). When standards bodies remain divided over UDC and thesaurus, a switching mechanism may be made which is watertight in the sense that the 100% recall is preserved. It will remain watertight only if the UDC and thesaurus are further developed simultaneously, each proposed addition to the one immediately initiating a corresponding proposal for an addition to the other and the additions being effectuated simultaneously. This requires central control of the information languages. The control of the switching mechanism between UDC and thesaurus for standards must be done centrally if the growth of diverging switching mechanisms is to be avoided.

Conclusion: Both UDC and thesaurus having been accepted by a part of the users as information languages for standards, central control is required for each of them (see sections 6.5.2 and 6.5.3). A switching mechanism between the two is indispensable for communication between the two language groups and should be made centrally if diverging switching mechanisms are to be avoided. It may take the form of the BSO.

6.5.5 Interconnected systems with multiple access points for interactive question-answer service

Compared with the manual card index system (Chapter 2), the computerized system opens possibilities for the future for an interactive question-answer service by telecommunications to one or more processing units. The processing unit or units may be centrally located together, or the systems may communicate directly by interlinking the machines over long distances, and may provide direct access to the master files of all the interconnected systems from the access points of each system. The direct communication between systems has the disadvantage that for one question all the interconnected systems may have to be interrogated (depending on the question), while after pooling the files at one location, the central pool only need be interrogated. Dispersed locations have the advantage that local question-answer traffic does not burden the central sub-system, and also the advantage that, having grown historically, the cooperation required is relatively little and simple. However, the historically-grown differences in technological level are then more likely to persist and will not so easily be mitigated by central services for cataloguing, indexing, repackaging, retrieval, switching of information languages etc. Therefore the central location may be preferred over dispersed locations.

In the interconnected systems, with or without central pool, the input will be decentralized.

For a treatise on multiclassificatory concept notation in relay switches and referral directories as tools for interlinkage of data bases, see K.Samuelson (1971) in FID Publication 405.

6.6 THE ISO NETWORK WITHIN THE UNISIST NETWORK

The international information network for standards may be considered an information sub-network in a world science information network. For an understanding of the place of the sub-network in the network the relation between standardization and other disciplines is of interest (section 6.6.1). Also of interest are the four successive forms that the stepwize answer to a question may take (section 6.6.2). The function of the world catalogue of standards in the network is discussed in section 6.6.3.

6.6.1 Standardization and other disciplines

The question whether standardization is a mission or discipline may be answered by: a mission, which may possibly develop into a discipline. Standardization was recognized as a problem to be solved or task to be performed long before it became recognized by some as a possible discipline. The NSB's and ISB's are mission oriented and so are the IMOSIO's. When we consider a discipline as a branch of learning taught as a body of fundamental knowledge, standardization is not now a discipline but could gradually develop into one.

The identity of standardization as a discipline will profit from making the standardization channels of information as easy or easier of access than the channels of other disciplines. A branch of learning taught as a body of fundamental knowledge must be sustained by easily accessible channels of information. For standardization these must be its own channels as far as the literature on standardization and as far as the standards not belonging to any other discipline are concerned. As far as the standards belonging to another discipline are concerned, these channels may be its own or the channels of the other discipline.

The mission of standardization is now better known than is its possible future nature as a discipline. In this study standardization is primarily considered a mission. Literally ISB's are IMOSIO's. But contrary to other IMOSIO's, the mission of ISB's is limited substantially to standardization and, for the sake of convenience, ISB's and (other) IMOSIO's are mentioned separately.

Standardization has a field of its own as well as common fields with many other disciplines. Standardization contributes to chemistry, physics, engineering, medicine, law (standard contracts), business (standard export documents), somewhat similar to the way philosophy, didactics and information science contribute to many disciplines, apart from making their own contribution to general science. A chemical standard may be considered to belong to:

- chemistry (as chemical composition, method of analysis, etc.)
- standardization (as a standard)
- information science (as a piece of primary literature).

The information scientist of a standards body will be aware that the majority of the ultimate users of the chemical standard will consider this document primarily to belong to the chemical literature. The majority will be looking for a piece of chemical literature which also happens to be a standard. The access services (abstracting, indexing and translating) that the chemists and other professionals have been used to, have developed traditionally by discipline and by language (See Baker, Parkins and Poyen, FID Publication 478, 1972). This position of standardization between other disciplines has its consequences for indexing languages like the UDC and the ISO thesaurus, used for the retrieval of standards as documents. It also has consequences for the place of the standards sub-network in the world science network. The UDC has a number 389 for standardization in general (previously 389.6), a number 389.16 for standards of weights and measures, a number 53.081 for units, a number 531.7 for metrology and a number 658.516 for company standardization. Recently the number 006 for standardization and standards was extensively developed and published in the year 1974, including the numbers 006.3/.8 for standards according to their nature, status, degree of standardization and content. Otherwize standards are classified where they belong according to their discipline. The scope of the ISO thesaurus for standardization is necessarily as wide as the scope of the standardization activities and is therefore concerned with the existing and anticipated thesauri in all fields where standards are made. An indexing term may occur in the thesauri of two or more fields. The standardizer, being concerned with standards in both fields, may need this term for indexing standards in both fields. To avoid confusion he may add to the index-term the field of application, or he may make use of meta-thesauri already developed, when making his own thesaurus for standardization.

For questions arising during efforts to derive a new mission-oriented information service by combining parts of ongoing services in several different disciplines, see D.B.Baker and R.E.O'Dette(1974).

A searcher for standards who belongs to a discipline may, in principle, use the channels of the discipline (other than standardization) or the channels of standardization. For example: a chemist in the Netherlands, looking for chemical standards on a particular subject, may in principle choose between two hypothetical sets of channels:

1. The channels of the chemical discipline: he may approach the Dutch national chemical information centre, which may answer the question supplying the document or reference to it, or may refer his question to a world centre, which may answer the question by supplying the document or reference to it, or may refer his question to the proper national chemical information centre, which will send the standard he is looking for or the reference to it.
2. The channels of standardization: he may approach the Dutch national standards information centre, which may answer the question by supplying the document or the reference to it, or may refer his question to the world information centre for standards, which may answer the question by supplying the document or the reference to it, or may refer his question to the proper national information centre for standards, which will send him the standard he is looking for or the reference to it.

In both hypothetical sets of channels the answer to a question may involve more than one national centre. Moreover in both sets of channels, the referral of questions to another centre may be done by passing on the question to that centre or by giving the client the address of that centre so that he can ask for himself.

In practice the Dutch chemist may choose between:

A. The Netherlands Organization for Chemical Information (NOCI) which is connected to international chemical documentation services covering some standards, including standards issued by ANSI.
B. The NNI information service which is connected to the international information network for standards.

One advantage of the channels of standardization is the comprehensive coverage of all countries. Another advantage is that separation of standards from other documents containing the stem"standard" in one of the keywords of the title or abstract is provided for by the services. In spite of these advantages, the scientist, due to the traditional organization of access services by discipline, is more likely to follow the channels of his own discipline than the channels of standardization. In any case, the questions for standards within a traditional discipline may be considered to belong to two subnetworks: on each level, national and worldwide, there may be two centres, one for the discipline and one for the standards. A part of the questions for standards will remain outside the standards network. By worldwide agreement it is conceivable to refer all questions on standards, which cannot be answered by the receiving centre by supplying either the documents or the reference thereto, to the national standards information centre which, if it cannot answer the question by supplying either the documents or the reference thereto, will either refer it to one or more other national standards information centres (if it knows which ones can supply the information) or will refer it to the international standards information centre, which will answer the question or refer it to the national standards information centres which it knows will be able to answer the question. If the question was passed on, the answer may be sent back to the centre originally receiving the request. If the address was given to the client to ask the question again himself, the answer may be sent directly to the client.

6.6.2 GRADATION OF SERVICES

6.6.2.1 Standards

The information in response to a question concerning standards may vary in content. The information service may be supplied in four steps:

- addresses where further information may be obtained (referral service)
- references to standards, including bibliographic descriptions (reference service)
- documents or copies (document service)
- data from the standards (fact service)

In section 1.1 a question was referred to, raised by the NNI Discussiegroep Normalisatie en Wetgeving (1973): Whether standards bodies are able and willing to act as central place for obtaining technical documents published by different authorities: technical regulations, rules, laws, etc. for the convenience of the users who will then find all documentation at one place. This question may be extended and modified by gradation in the light of these four forms the service may take. An answer, following this gradation, could for example be as follows: The standards bodies may supply:

- Referral to addresses of organizations issuing all kinds of documents bearing some resemblance to standards (See section 1.1). This should fit in the UNISIST referral system, and should be made possible by it.
- Reference information on all documents of a primarily normative nature, including among others the standards issued by international mission-oriented organizations. This should be made possible by a world catalogue of standards.
- Documents or copies of all national (homemade or foreign) and international standards issued by national and international standards bodies. This should fit in, and be made possible by, the mutual agreements between standards bodies.
- Facts or data from the standards issued by the standards body itself. This is made possible, inter alia, by the presence of the technical secretariats of the standardization committees in or near the office of the standards body and should fit in a supplementary factographic information system.

Other gradations than the above are conceivable (F.W. Lancaster 1968).

6.6.2.2 Laws

The same gradation of services (into referral, reference, document and facts) is available to the legislator defining technical conditions in the law. He also has the choice between these four types of service for giving the public access to the contents of the law he is making:

- the data or facts (in casu the technical requirements) may be specified in the law, making revision of the law necessary when the technical requirements change.
- the documents (in casu the standards specifying the technical requirements) may be reproduced in the law, making replacement of the reproduction necessary when the standards are revised.
- the reference (in casu the number, title and date of publication, of the standards) may be included in the law, making an update of the reference necessary when the standards are revised.
- referral to an address (in casu the standards body having the authority to issue the relevant standards) indicated by the law as a means of complying to the requirements of the law, which will be stated in very general terms. Note: This does not make the standard mandatory, since other means of complying to the requirements are not excluded.

L.C. Verman (1973) described four possibilities of the legislator, using somewhat different terminology:

- detailed legislation
- reproduction method
- reference method

- means of compliance method.

While the legislator has the choice between these four possibilities, it is the opinion of the present author that the NSB's should be prepared to give all four services, as indicated above. Moreover, the NSB should preferably have an index available to all national standards of its own country whereof the requirements are found in the law, either by concurrence of facts, by reproduction of standards, by reference, or by referral to the authority. This index should have entries from the standards-side (standards reference number, UDC, descriptors, technical committee) as well as from the law-side (date of publication in state papers, date of law, name of law).

The accessibility of treaties has been reviewed by A. Sprudzs in FID Publication 506, 1974. The review includes, inter alia, the World Treaty Index 1920-1970, which is reported to be accessible by serial number, signatory of the treaty, date of signature, major topic group, detailed topic, and textual references to international organizations.

When the referral method is generally followed, the work towards standards and the work towards laws may be so detached as to progress independently. A draft standard need not then carry a title or other indication of its anticipated use in the law (such as, in the Dutch language: "Voorschrift voor...") not even when the law has indicated that the NSB is the authority to issue standards in that specific field.

Laws and regulations with standardization value may be harmonized between nations by harmonizing the laws and regulations themselves, or by referring in the different laws and regulations to harmonized national standards.

6.6.3 The world catalogue of standards in the network

In the CICS system every participant sent all cards to all other participants and each participant merged the cards received into his own file. The merging, in other words, was replicated as often as there were participants. Each participant has equal chance and opportunity to effect the manual merging. Because of its manual nature there were no barriers due to inavailability of machines.

In the design for the world catalogue of standards every participant would send his records to one central place only, where the records would be merged and distributed equally to all participants and interested non-participants. The non-participants could be individuals, NSB's in statu nascendi, or non-members of ISO.

In an exchange network (see section 4.8.5) records will be supplied upon demand by participants and merging could in principle be done by each participant demanding all records of all other participants. In practice, however, the machine-merging can be done only by those larger industrialized participants having computers suitable for this operation. By no means an equal chance or equal access! NSB's having relatively good access to standards by computer already, will further improve

their access, while NSB's lacking computers and having relatively difficult access will remain in that position. The main hope for these NSB's in the exchange network will be that the central secretariat or another participant in the system, will demand all records of all participants on a continuous basis and merge and distribute them, also on a continuous basis, to all interested. This would mean taking recourse to the essentials of the world catalogue system.

The exchange network by itself opens no inherent guarantees that the interests of small countries and of less industrialized countries will be served as well as the interests of the larger industrialized countries. There is no guarantee against the possibility that larger industrialized countries will exchange information substantially among themselves, using their advanced computing and telecommunication equipment, while the other countries may be left outside, not formally but substantially. In the absence of a strong provision for direct access of all participants to the files exchanged between any participants, the most likely defence against such a development would be the forming of blocks of outsiders, pooling their interests, to obtain direct access by terminals at locations in their countries. In the world catalogue design on the other hand, the required agreement on the operation of the central agency would imply a guarantee for small or less industrialized countries.

For advantages of a central world documentary data base (in casu for agricultural documents) see G. Dubois in FID Publication 506, 1974. See also section 5.2.5.

In the light of the difference in substantial use between the world catalogue system and the exchange network (without central subsystem), any offers made by two or more industrialized countries to test out experimentally among each other certain parts of the exchange network, such as for example the contents and format of the bibliographic description of standards, should be watched with reserve. The absence of the other countries in such an experiment would seem disputable in the light of the consensus principle (consulting all interested parties), rightly applied in international standardization, and it introduces the danger that the experiment of the few will be the forerunner of a permanent situation. In other words that the experiment of a few will become the lasting operation of a few, with the probability of suboptimization in favor of hardware efficiency. The experiments, in order to be of value for a truly worldwide system, should involve from the beginning one or more countries being representative for the smaller and less industrialized countries. Even then, the advantage of a centrally-issued world catalogue issued in book or card-form is that all parties receiving the catalogue have equal access to the reference information on standards contained in it.

As was said in section 4.8.5, the exchange network for standards and the world catalogue of standards should not be seen as competing alternatives, but rather as complementary to each other. The existence of the network may help to prevent overloading of the central system by dealing with local questions locally, and with some bilateral questions bilateral-

ly. The world catalogue system will prevent the network from substantially leaving the smaller and less industrialized countries outside. The WCS system will supply reference information only. The participants of the network will be able to supply the documents or the data contained in them.

In the world science information system (the UNISIST network) the network for standards will be a sub-network. The presence at a central point of a world catalogue of standards for reference information and a referral directory for addresses where further information on particular standards may be obtained, is of clear significance as long as there are users for a standard as such. As a publication of a discipline the standard will be accessible through the channels of the discipline.

CHAPTER 7

SUMMARY

7.1 SUMMARY IN ENGLISH, with ABSTRACT

Two systems for documentary information designed by the author and fifteen designed by others are evaluated as regards their handling of standards, by using ten well-known and seven newly suggested characteristics. By combining the salvage values of these 17 systems advice is given for the possible benefit of future designers of information systems for the international accessibility of standards.

Standards taking the form of documents are means of communication. They cover many subject-fields of interest to a variety of users. Methods of communication are covered by standards in such fields as terminology, documentation and information processing. Standards bodies promote standardization by formulating standards and offering the users access to the documents. The user, after accepting this offer by taking access, may comply with the standard, in other words he may standardize. When the information system of a standards body has not made a standard sufficiently accessible to a potential user, he may make his own standard, in which case the information system has failed at the expense of a vital function of the standards body. Other factors influencing the individual's choice between his own solution and the solution offered by the standard are mentioned.

In general, different countries have different standards, although some standards happen to be the same, some have been made the same by harmonization, and some have issued from the start as international standards. By retrieving and displaying the standards of different nations on a certain subject, an international information system for standards facilitates the process of harmonization by which unnecessary differences are eliminated and necessary differences are sustained or introduced.

Access across national borders has been a major objective for the design of international information systems for standards and a minor objective for the design of a few national information systems for standards. The concept "standard" differs among the Standards Bodies (SB's) and the international mission-oriented standards issuing organizations (IMOSIO's) and improvements in the international accessibility of standards will depend largely on a standardization among these organizations of this concept.
The information systems of IMOSIO's and SB's must remain isolated and cannot have a common specialized subsystem for reporting, storing, retrieving and communicating documentary information on standards since they have different separation functions related to the aims of the organizations, for useful and useless data, to separate standards from other documents. The systems may communicate only in the way isolated systems communicate: by observing messages and applying their own separation function to them. For the establishment of a

merged data base of reference information on standards from national and international standards bodies and IMOSIO's, an intuitive separation function must be applied to separate standards from other documents, until factual standardization of the concept "standard" has been achieved among these organizations. After that, the separation function for the merged data base may be programmed.

The identity of standardization as a discipline will profit from making the standardization channels of information as easy or easier of access than the channels of other disciplines.

The standardization committees are the authors of the standards issued by SB's and constitute an entry to channels of information leading directly to the sources of formal standardization, offering the possibility of observations from and messages to the planning stages of standardization work. An information system for standards may better serve the vital functions of the standards body when the design of the system has taken into account the planning of the standardization committees.

The inclusion of final draft standards in the coverage of an international information system for the accessibility of standards does not only make the draft standards accessible, but also secures the accuracy and response-time of the system as regards the standards when they issue. Acceptance by the standardization committees of a duty to supply information on early draft standards will promote an open democratic procedure. Lack of progress in a standardization committee should not delay a desirable unification at a lower level or in a smaller context.

The UDC may be used for classifying the working field of standardization committees. However, the UDC number of a standardization committee is generally too broad for useful application to individual standards.

In an environment of international cooperation, such as international standardization, the value of information increases when it is not limited, but spread to the extent that it becomes available within reach of anybody who feels he has need of it. Spreading of information on standards is in the common interest of mankind.

A continuous quantitative and qualitative analysis of the distribution of individual standards to their ultimate individual users may provide feed-back information for an information system for the accessibility of standards in order to improve further the satisfaction from the system in the prevailing environment as well as in order to give early warning signals about changes in the environment which may require adjustments of the system.

In comparing information systems for the international accessibility of standards in existence in the years 1968 through 1973 by using well-known characteristics of information systems in general, the characteristics of reliability, accuracy, life-span, volume, traffic, construction-period and

costs could be taken for granted in the environment of standardization, while the characteristics of maintainability, flexibility and response-time were so significant in the same environment that they could be used as criteria. Other less-known characteristics are also significant: coverage, implementability, accessibility to the user, compatibility between systems, salvage value, impartiality to man and machine and language insensitivity. Some characteristics reflect realities, but others reflect potentialities which may or may not be realized. Factors like national satisfaction values and solidarity in international cooperation play their part in the realization.

Since a world information system for standards needs to be approached through a process of successive approximations, the salvage value of a system is important for the designers of the next and following systems. The salvage values of the systems may be combined as follows: Maintainability and flexibility may be achieved by modular design. Response-time may be improved by inclusion of draft standards and draft revisions. Coverage may be made more comprehensive by standardization of the concept "standard" and may be made more clear by gradation of referral, reference, document and fact service. Other sources of normative instruction (such as regulations, laws and conventions) and standards at branch, company or house level may be included in the referral service only. Implementability and impartiality to manual and machine participation may be enhanced by offering optional central assistance in preparing machine readable input. Accessibility to the user may be improved considerably by harmonization of catalogue records on standards. Decentralized preparation of input to achieve accuracy of input may be combined with centralized merging and distribution for improved accessibility and equal access to the users. External compatibility may be achieved and guarded by participation in the development of a world science information system by UNISIST, which may supply the principles on which the standards-subnetwork should be based in order to be compatible with other sub-networks. Insensitivity to natural languages is an ideal which should be approached as closely as possible in information systems involving two or more language groups among its users, among other things by employing numeric codes or other codes not related to any natural language as intermediate.

Given a preference for organizational decentralization of the standardization function of international technical committees, integration and partial centralization of information services obeys this preference by facilitating decentralization of this function. In an information network for standards the following functions should preferably be performed by a central agency: merging of reference information, designation of UDC numbers, keeping a thesaurus of descriptors, maintaining a switching mechanism between UDC and thesaurus, and providing an interactive question-answer service by telecommunication. The switching mechanism may take the form of the broad system for ordering knowledge and information being developed within the UNISIST framework. Merging of reference information on standards as a planned function of a central agency (compared to merging as an incidental, dispersed function) has the advantage that the merged sequences may answer questions before they arise and may help searchers to formulate individual search questions more specifically.

In a world information system wherein one or more parti-

cipants have to rely on processing and communication by men rather than by machines, impartiality to manual and machine participation actually implies giving priority to the manual participant. In an international information network for standards comprising both largely manual systems in small or developing countries and advanced automated systems in large and developed countries, the first objective should be the improvement of the accessibility from the manual systems to obtain equal access from all systems, rather than the further improvement of accessibility from or between the advanced automated systems. In order to promote equal access to reference information on standards in a network of Standards Bodies, some of which have no machines for reading, the communication format should be readable by man.

A world catalogue of standards, issued in book or card-form, promotes equality of access to reference information on standards. The catalogue may be complementary to an international network for exchanging information on standards and is to be preferred for answering questions involving multilateral communication. It may function as a central subsystem in the exchange network.

In order to obtain optimal results at the international level the secretariats of ISO special committees should be conducted by the general secretariat rather than by member bodies volunteering to do so in view of solutions found optimal in their national environment. Any offers made by large industrialized countries to test out experimentally among each other in the absence of small or developing countries certain parts of an exchange network, such as for example the contents and format of a bibliographic description for standards, should be watched with reserve, since the experiment may become a lasting operation with suboptimization in favour of hardware efficiency. Developing countries have a more urgent need for improvement of the international accessibility of standards than have developed countries, and the quality of their voice in the ISO information committee should receive relatively high attention as long as their numerical representation remains relatively low.

The information systems should treat destandardization as equally important an event as standardization. Abandonments and revisions are as important as new standards. A favourable effect may be postulated to result from alternating or concurring standardization and destandardization. Concurrence is to be preferred to alternation. A citation index inverting the backward relation "(draft) standard referring - (draft) standard referred to" to the foreward relation "(draft) standard referred to - (draft) standard referring" is a desirable searching tool for a standardizer studying the revision of standards.

A standard may be made mandatory by law. Laws may have standardization value. To approach the optimal uniformity of voluntary standards and the optimal uniformity of mandatory laws it is required to uncouple the drafting of standards and the drafting of laws relating to the same subject matter, particularly of international standards and harmonized laws. Uncoupling does not exclude the possibility of reference to

standards in laws, not even when the law is issued before the standard. Information services comprising both voluntary standards and laws with standardization value may be gradated in referral, reference, document and fact service for the convenience of both the user and supplier of the information.

ABSTRACT: Seventeen information systems for documentary information are described as regards their handling of standards as documents, and are evaluated by using seventeen characteristics. By combining the salvage values of these systems an advice is given for the design of future information systems for the international accessibility of standards.

7.2 Samenvatting in het Nederlands.

Twee systemen voor documentaire informatie ontworpen door de auteur en vijftien ontworpen door anderen worden geëvalueerd voor wat betreft hun verwerking van normen, door gebruik te maken van tien welbekende en zeven nieuw voorgestelde karakteristieken. Door de sloopwaarden van deze 17 systemen te combineren wordt een advies gegeven, dat mogelijkerwijze van voordeel zal zijn voor toekomstige ontwerpers van informatiesystemen voor de internationale toegankelijkheid van normen.

Normen die de vorm aannemen van documenten zijn communicatiemiddelen. Zij bestrijken vele terreinen, van belang voor een verscheidenheid van gebruikers. Methoden van communicatie worden bestreken door normen op terreinen als terminologie, documentatie en informatieverwerking. Normalisatie instituten bevorderen normalisatie door het formuleren van normen en het aanbieden van toegang tot de documenten aan de gebruikers. De gebruiker, na het aanvaarden van dit aanbod en het gebruik maken van de geboden toegang, kan zich voegen naar de norm, met andere woorden, hij kan normaliseren. Als het informatiesysteem van een normalisatie instituut een norm niet voldoende toegankelijk heeft gemaakt voor een potentiële gebruiker, dan kan deze zijn eigen norm maken, in welk geval het informatiesysteem heeft gefaald ten koste van een vitale functie van het normalisatie instituut. (Hoofdstuk 6.1.2 sub 13). Andere factoren die van invloed zijn op de keuze van het individu tussen zijn eigen oplossing en de oplossing die de norm biedt, worden genoemd. (Hoofdstuk 1.6)

In het algemeen hebben verschillende landen verschillende normen, ook al zijn sommige normen toevallig hetzelfde, zijn sommige hetzelfde gemaakt door harmonisatie, en zijn sommige van het begin af aan uitgekomen als internationale norm. Door het terugvinden en ten toon spreiden van de normen van verschillende landen over een bepaald onderwerp, bevordert een internationaal informatiesysteem voor normen het harmonisatieproces waardoor onnodige verschillen worden geëlimineerd en noodzakelijke verschillen worden gehandhaafd of ingevoerd. (Hoofdstuk 1.2)

Toegang over de nationale grenzen heen is een belangrijke doelstelling geweest voor het ontwerpen van internationale informatiesystemen voor normen en een bijkomstige doelstelling voor het ontwerpen van enkele nationale informatiesystemen voor normen. Onder de normalisatie instituten (SB's) en de internationale taak-gerichte normen uitgevende organisaties (IMOSIO's) verschilt het begrip "norm" en verbeteringen in de internationale toegankelijkheid van normen zal in hoge mate afhangen van de normalisatie van dit begrip onder deze organisaties.
De informatiesystemen van IMOSIO's en SB's moeten geïsoleerd blijven en kunnen geen gemeenschappelijk gespecialiseerd subsysteem hebben voor rapportering, opslag, terugvinden en communicatie van documentaire informatie over normen aangezien zij verschillende separatiefuncties hebben die verband houden met de doelstellingen van deze organisaties, voor bruikbare en onbruikbare gegevens, om normen te scheiden van andere documenten. De systemen kunnen slechts communiceren zoals geïsoleerde systemen communiceren: door boodschappen waar te

nemen en de eigen separatiefunctie erop toe te passen. Voor de instelling van een samengesmolten gegevensbank van referentie gegevens over normen van nationale en internationale normalisatie instituten en IMOSIO's moet een intuitieve separatiefunctie worden toegepast om normen te scheiden van andere documenten, totdat feitelijke normalisatie van het begrip "norm" onder deze organisaties tot stand gebracht zal zijn. Daarna zal de separatiefunctie voor de samengesmolten gegevensbank kunnen worden geprogrammeerd. (Hoofdstukken 6.3 en 6.4).

De identiteit van de normalisatie als een discipline zal er wel bij varen als de informatiekanalen van de normalisatie even gemakkelijk of gemakkelijker toegankelijk zullen zijn dan de kanalen van andere disciplines. (Hoofdstuk 6.6.1)

De normalisatie commissies zijn de auteurs van de normen uitgegeven door de SB's en vormen een ingang tot de informatiekanalen die rechtstreeks naar de bronnen van de normalisatie leiden, en die de mogelijkheid bieden van waarnemingen van en boodschappen naar de planning stadia van het normalisatiewerk. Een informatiesysteem voor normen kan de vitale functies van het normalisatie instituut beter dienen als het ontwerp van het systeem rekening heeft gehouden met de planning van de normalisatie commissies. (Hoofstuk 6.1.3.9)

Het opnemen van definitieve normontwerpen in de strekking van een internationaal informatiesysteem voor de toegankelijkheid van normen, maakt niet alleen de normontwerpen toegankelijk, maar stelt ook veilig de nauwkeurigheid en antwoordtijd van het systeem voor wat betreft de normen zelf wanneer zij uitkomen. Aanvaarding door de normalisatie commissies van een informatieplicht voor voorlopige normontwerpen zal een open democratische procedure bevorderen. (Hoofdstuk 6.1.2.2.3) Gebrek aan vooruitgang in een normalisatie commissie behoort een gewenste unificatie op lager niveau of in kleiner verband niet te belemmeren. (Hoofdstukken 4.4 en 4.8.1 en 5.2.4 en 6.5.1)

De UDC kan gebruikt worden om het werkterrein van normalisatie commissies te classificeren. Het UDC nummer van een normalisatie commissie is echter in het algemeen te breed voor bruikbare toepassing op de afzonderlijke normen. (Hoofdstuk 3.4.2.7)

In een omgeving van internationale samenwerking, zoals internationale normalisatie, neemt de waarde van informatie toe als deze niet wordt beperkt, doch gespreid in die mate dat de informatie beschikbaar komt binnen het bereik van een ieder die naar zijn eigen mening er behoefte aan heeft. Het verspreiden van informatie over normen is een gemeenschappelijk belang van de mensheid.

Een continue quantitatieve en qualitatieve analyse van de verspreiding van afzonderlijke normen onder hun uiteindelijke individuele gebruikers kan terugkoppelingsinformatie leveren voor een informatiesysteem voor de toegankelijkheid van normen om de bevrediging vanuit het systeem in de bestaande omgeving te verbeteren en om vroege waarschuwingssignalen te geven aangaande veranderingen in de omgeving die aanpas-

sing van het systeem kunnen vergen.

Bij het vergelijken van informatiesystemen voor de internationale toegankelijkheid van normen uit de jaren 1968-1973, door middel van welbekende karakteristieken van informatiesystemen in het algemeen, konden de karakteristieken betrouwbaarheid, nauwkeurigheid, levensduur, omvang van opslag, verkeer, constructie periode en kosten als vanzelfsprekend gegeven aangenomen worden in de omgeving van de normalisatie, terwijl de karakteristieken onderhoudbaarheid, flexibiliteit en antwoordtijd zo significant waren in dezelfde omgeving dat zij konden worden gebruikt als criteria. (Hoofdstuk 6.1.1) Andere, minder bekende begrippen zijn ook significant als karakteristiek: strekking, implementeerbaarheid, toegankelijkheid voor de gebruiker, compatibiliteit tussen systemen, sloopwaarde, onpartijdigheid ten opzichte van man en machine en ongevoeligheid ten opzichte van natuurlijke talen. Sommige karakteristieken weerspiegelen realiteiten, doch andere weerspiegelen mogelijkheden die al dan niet worden verwerkelijkt. Factoren zoals nationale bevrediging enerzijds en solidariteit in internationale samenwerking anderzijds spelen hun rol bij de verwerkelijking. (Hoofdstuk 6.1.4.1)

Aangezien een wereld-informatiesysteem voor normen nagestreefd zal moeten worden door middel van opeenvolgende benaderingen, is de sloopwaarde van een systeem van belang voor de ontwerpers van de daarop volgende systemen. (Hoofdstuk 6.1.2 sub 15) De sloopwaarden van de systemen kunnen als volgt worden gecombineerd: Onderhoudbaarheid en flexibiliteit kunnen worden bereikt door een modulair ontwerp. De antwoordtijd kan worden verbeterd door ontwerp-normen en ontwerp-herzieningen op te nemen. De strekking kan meeromvattend gemaakt worden door normalisatie van het begrip "norm" en kan duidelijker gemaakt worden door gradatie van dienstverlening in: verwijzing naar de bron, citeren van de referentie gegevens, leveren van het document en verschaffen van de feitelijke gegevens uit het document. Andere bronnen van normatieve instructie (zoals voorschriften, wetten en conventies) en normen op industrietak-, bedrijfs- of huis-niveau kunnen desgewenst uitsluitend in de bronverwijzing worden opgenomen. Implementeerbaarheid en onpartijdigheid ten opzichte van hand en machine deelname kan verbeterd worden door centrale hulp te verlenen op verzoek bij het klaarmaken van door de machine leesbare invoer. De toegankelijkheid voor de gebruiker kan aanzienlijk verbeterd worden door harmonisatie van de catalogus-gegevens voor normen. Gedecentraliseerde productie van invoer, om een nauwkeurige invoer te verkrijgen, kan worden gecombineerd met gecentraliseerde samensmelting en verspreiding ter wille van een verbeterde toegankelijkheid en gelijke toegang voor de gebruikers. Externe compatibiliteit kan bereikt en bewaakt worden in de ontwikkeling van een wereld systeem voor wetenschappelijke informatie door UNISIST, dat de uitgangspunten kan leveren waarop het subnetwerk voor normen gebaseerd dient te zijn om compatibel te zijn met andere subnetwerken. Ongevoeligheid voor natuurlijke talen is een ideaal dat zo dicht mogelijk dient te worden benaderd in informatiesystemen waarbij twee of meer taalgroepen onder de gebruikers betrokken zijn, onder andere door als intermediair gebruik te maken van numerieke codes of van andere codes, die niet verbonden zijn met enige natuurlijke taal. (Hoofdstukken 6.1.2 sub 17 en 6.1.3.9).

Gegeven een voorkeur voor organisatorische decentralisatie van de standaardisatie functie van internationale technische commissies, nemen integratie en gedeeltelijke centralisatie van informatiediensten deze voorkeur in acht door de decentralisatie van deze functie te vergemakkelijken. (Hoofdstuk 2.3.11.2). In een informatie netwerk voor normen behoren de volgende functies bij voorkeur door een centrale dienst te worden vervuld: het ineenvoegen van citaten, het toekennen van UDC nummers, het maken en bijhouden van een thesaurus van descriptoren, het bijhouden van een overeenstemming (concordantie) tussen de UDC en de thesaurus, en het verschaffen van een interactieve vraag en antwoord dienst door telecommunicatie. (Hoofdstuk 6.5) De concordantie kan de vorm aannemen van het Breed Systeem voor Ordenen (BSO) van kennis en informatie dat ontwikkeld wordt binnen het raamwerk van UNISIST. Het ineenvoegen van citaten van normen als een geplande functie van een centrale dienst (vergeleken met het ineenvoegen als een incidentele, verspreide functie) heeft het voordeel dat de ineengevoegde volgordes vragen kunnen beantwoorden voordat zij opkomen en de zoekers kunnen helpen om afzonderlijke vragen specifieker te formuleren. (Hoofdstuk 6.5.1).

In een wereld informatiesysteem waarin één of meer deelnemers aangewezen zijn op verwerking en communicatie met de hand en zonder machine, impliceert onpartijdigheid ten opzichte van hand en machine deelname in feite het geven van prioriteit aan hem die zonder machines deelneemt. (Hoofdstuk 6.1.2 sub 16). In een internationaal informatie netwerk voor normen, waarvan zowel grotendeels met de hand bediende systemen in kleine of ontwikkelingslanden deel uitmaken, als ook geavanceerde geautomatiseerde systemen in grote ontwikkelde landen, dient de eerste doelstelling te zijn het verbeteren van de toegankelijkheid vanuit de handsystemen om gelijke toegang te verkrijgen vanuit alle systemen, en niet de verdere verbetering van de toegankelijkheid tussen (of vanuit) de geavanceerde geautomatiseerde systemen. Teneinde gelijke toegang tot referentie informatie over normen te bevorderen in een netwerk van normalisatie instituten, waarvan sommigen geen machines hebben om te lezen, moet de communicatie-opmaak (Engels: format) leesbaar zijn voor mensen.

Een wereld catalogus van normen, uitgegeven in boek- of kaartvorm, bevordert gelijkheid van toegang tot referentie gegevens over normen. De catalogus kan complementair zijn ten opzichte van een internationaal netwerk voor het uitwisselen van informatie over normen en verdient de voorkeur voor het beantwoorden van vragen die multilaterale communicatie vereisen. De catalogus kan als centraal subsysteem fungeren in het uitwissel-netwerk. (hoofdstukken 4.8.5 en 6.6.3).

Teneinde optimale resultaten op het internationale vlak te bereiken, dienen de secretariaten van de speciale commissies van de ISO gevoerd te worden door het algemene secretariaat en niet door leden-organisaties, die zich daarvoor vrijwillig aanmelden gezien de oplossingen, die zij als optimaal hebben ervaren in hun nationale omgeving. Eventuele aanbiedingen gedaan door grote geïndustrialiseerde landen om onder elkaar in de afwezigheid van kleine- of ontwikkelingslanden bepaalde delen van een uitwissel netwerk te beproeven, zoals bijvoorbeeld de inhoud en opmaak van de bibliografische beschrijving voor normen, dient met reserve bezien te worden, aangezien het experiment een blijvende gang van zaken kan worden, met suboptimalisatie ten gunste van de doelma-

tigheid van de apparatuur. Ontwikkelingslanden hebben een urgentere behoefte aan verbetering van de internationale toegankelijkheid van normen dan ontwikkelde landen, en de hoedanigheid van hun stem in de ISO-informatie-commissie dient relatief grote aandacht te krijgen zolang hun numerieke vertegenwoordiging relatief klein blijft. (Hoofdstukken 4.4 en 6.6.3).

De informatiesystemen dienen destandaardisatie te behandelen als een even belangrijke gebeurtenis als standaardisatie. Intrekkingen en herzieningen zijn even belangrijk als nieuwe normen. Een gunstige uitwerking kan verwacht worden van afwisselende of gelijktijdige standaardisatie en destandaardisatie. Gelijktijdigheid verdient de voorkeur boven afwisseling. Een citatenindex die de achterwaartse relatie "verwijzende (ontwerp-) norm - verwezen (ontwerp-) norm" omkeert tot de voorwaartse relatie "verwezen (ontwerp-) norm - verwijzende (ontwerp-) norm" is een wenselijk zoekinstrument voor een normalisator die de herziening van normen bestudeerd. (Hoofdstukken 2.3.7 en 4.8.2).

Een norm kan bindend gemaakt worden door de wet. Wetten kunnen standaardisatie-waarde hebben. Om de optimale uniformiteit van vrijwillige normen en de optimale uniformiteit van bindende wetten, betrekking hebbend op hetzelfde onderwerp, te benaderen, in het bijzonder van internationale normen en geharmoniseerde wetten, is het noodzakelijk de opstelling van normen en de opstelling van wetten te ontkoppelen. Ontkoppeling sluit de mogelijkheid niet uit van verwijzing naar normen in wetten, zelfs niet wanneer de wet eerder uitkomt dan de norm. Informatiediensten,die zowel vrijwillige normen als wetten met standaardisatie-waarde bestrijken,kunnen ten bate van zowel de gebruiker als verschaffer worden gegradeerd in diensten voor bronverwijzing, citeren van referentie gegevens, leveren van het document en verschaffen van de feitelijke gegevens uit het document. (Hoofdstukken 1.7 en 6.6.2).

ANNEX 1

RULES AND RECOMMENDATIONS

FOR CATALOGUES OF STANDARDS

(taken from the original rules in ISO/Council Document 1957-13)

AND FOR INDEX CARDS FOR STANDARDS

(construed from the revision by ISO/Council Document 1959-14 and the modification of paragraph 2.3 by ISO/Council Resolution 1960 - 8)

RULES FOR COMPILING CATALOGUES OF STANDARDS

Catalogues of standards should consist of three parts as follows:

1 A systematic list, constituting the main part of the catalogue, in which every standard with its full title, date and other customary indications is arranged in accordance with the system used by the national member body (i).

2 An alphabetical index of the principal (title) entry words, in which for every standard or group of standards the relevant national designation, as well as the page-number(s) or UDC-number(s) are given, thus facilitating reference to the systematic list.

3 A UDC-classified list (ii) in which every standard (with its relevant national designation) is included under broad UDC-subject-headings as given in the Abridged Schedule in Section III.

(i) It is recommended that all countries should adopt the Universal Decimal Classification System as a basis for the classification.

(ii) If the systematic list is based on the UDC-system, the UDC-classified list (Part 3) can be omitted.

The systematic list, arranged according to the UDC, provides for the arrangement of all the standards under classified headings given in Section III (abridged UDC schedule for classifying standards and for the systematic part of catalogues of standards).

If the standards under any one heading become too numerous, this can be subdivided further, but it is not recommended that more general headings than those given should be chosen. The existing headings should be used so far as possible.

No general rules can be laid down for cross-reference between groups, since this depends on the number of standards listed and the possibility of viewing them from different angles. It is left to the discretion of individual standardizing bodies to develop these to the desired extent.

The UDC-numbers for standards are assigned according to the Rules given in Chapter I, and Standards are filed at least under their primary UDC-number (if more than one is given).

CICS

COMMITTEE FOR INDEX CARDS FOR STANDARDS

REVISED DRAFT OF RULES

GOVERNING STANDARDS CARDS

1. PURPOSE

The card filing system described in the following rules has been developed to facilitate the use and the coordination of the large number of standards issued by the national standards bodies.

2. PREPARATION AND DISTRIBUTION OF THE CARDS

2.1 All standards should be assigned a UDC code number consisting of at least one, sometimes two and occasionally three (or even four) UDC index numbers, usually connected by means of the: (colon) sign. For each standard, a master card should be prepared by the national standards bodies in conformity with the directions given in paragraph 3.

2.2 It is recommended that the UDC index numbers should not be more detailed than is necessary.

2.3 As the filing is done by the UDC index numbers given on each card and by the numerical order by the cards prepared by each standard body, and by the number or letter-number index of the corresponding national standard, there must be as many copies of a given card sent out as that card has UDC index numbers, plus two. The total number of such copies of one and the same card constitutes a set.

A: 5251-1/E

2.4 The exchange of cards takes place along with the exchange of standards already in operation between national standards bodies. While the goal of the card index system is to cover all existing standards, it is felt to be desirable to begin the issuance of cards for all standards published after a fixed date and later on to complete the cards covering standards published prior to that date. (National standards bodies will find it to their interest to begin and to complete these cards as soon as possible.)

2.5 Member Bodies wishing to obtain several sets should so advise the distributing body.

3. CARDS: SIZE AND LAYOUT

3.1 In General

The cardboard used for the cards should be sufficiently thick and firm to be manipulated in a card-file.

The cards should be cut to the prescribed dimensions before being sent out.

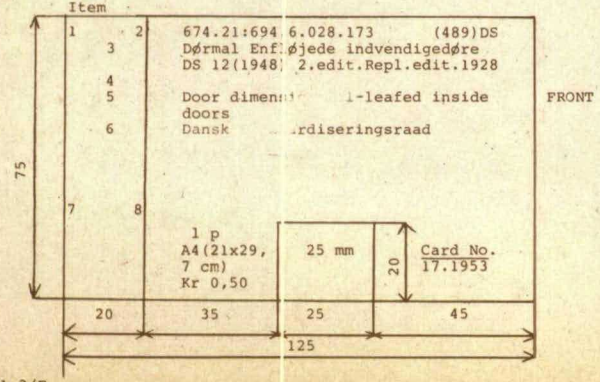
3.2 Size and tolerances

Card dimensions must be: 75x125 mm with maximum tolerances of 1.2 mm (76.2 mm = 3 in) and 2.0 mm (127 mm = 5 in)

3.3 Layout

A single card should be made for any one given standard and the layout should conform to that of the diagrammatic specimen below:

3.3.1 Front, face or recto layout and indications



A:5251-2/E

Key to items

1. UDC Subject code number

2. UDC ( ) number for issuing country with letter symbol for standards body

3. Original title (key word(s) underlined), Reference No., year and edition (other than first).

   Words repeated at beginning of each title, such as "Danske Norm" or "British Standard" should be omitted. If the national standard is an adaption of the standard of a recognized body, its original designation should figure in parentheses immediately after the original title, or after the edition No., e.g.: (ASTM C-225-1949).

4. Space for receiving country to translate title into its own language.

5. Translation of title in English or French or Russian, when original is not one of these. If the language of the issuing country is one of the three official languages of the ISO, it is recommended that the title of the standard be given in one of the two others. In any case, the title should be given in English or French with keyword(s) underlined. The translation may appear on the back of the card if there is not enough room on the front.

6. The name of the issuing body just above the rectangular (perforation) space.

7. Number of pages, size and price (in that order) in three separate lines.

8. Serial Card No., followed by the year in which the card is prepared. These serial numbers serve as reference for filing or checking the cards of any given standards body, since they are specific to that body.
   Any new card replacing an existing card must bear the initial serial number, followed by the year in which the new card is prepared. Thus, the index card for a particular standard issued in 1947 may have the serial number 189.1952 (assuming it was prepared in 1952), but for the first revision, i.e. the second edition issued in 1957, the serial number will be 189.1958 (assuming it was prepared in 1958). When a standard is withdrawn, the corresponding card(s) must also be withdrawn from the UDC classified file, and the card filed by country and serial number marked but retained for future reference.
   When a standard is replaced by several (new) standards, cards must be prepared for each of those, one of them taking the initial serial No. and the others new serial numbers in the order of the national series.

A:5251-3/E

3.3.2 Back or verso

9	Dimensions of doors, frames and wall openings are given together with placing of locks, hinges and letter slits	BACK
10		

Translation of title (as directed under 3.3.1.5 above, if no room on front).

9. Short summary in English or French or Russian; if in Russian, it should be given in English or French also. No summary is necessary if the title provides a sufficiently clear idea of the contents of the standard.

10. Supplementary indications to be added by the receiver

The following additional indications might be given on the back of the card:

Indication of the corresponding national standards
Indication of corresponding ISO publications
Archive numbers, etc.
Translation of the summary

4. RECOMMENDATION CONCERNING THE USE OF THE CARD INDEX FILE

The use of the main card file will ordinarily necessitate an alphabetical key to the UDC system. The various abriged editions of Universal Decimal Classification may be used for this, as well as the trilingual edition.

16 January 1959.

ANNEX 2

Illustration of CICS index cards for standards

UDC 632.95 389.6 (100) ISO

Common names for pesticides (first list)

Noms communs pour les pesticides (première liste)

Общепринятые названия пестицидов. (Первый список.)

ISO/R 116 - 1959

International Organization for Standardization
Organisation Internationale de Normalisation
Международная Организация по Стандартизации

1, rue de Varembé, GENEVA, Switzerland

7 p.
A4 (21 x 29.7 cm)
Sw.Fr. 5.25
Fr.fr.

Card Fiche No. 133. 1963

(42) BSI

631.3 : 629.11.012.3

Wheels for agricultural machinery, implements and trailers. Part 2. Tyre and rim sizes.

BS 3486: Part 2: 1970 (supersedes 1965 ed.)

BRITISH STANDARDS INSTITUTION

Card No.

6 pp.
A5(21x14.8cm)
6 s. (30 p.)

1117.1970

003.63:51 437 (ČSN)

Matematické značky

ČSN 01 1001 (1961). nahr. ČSN 01 1001 (1953)

Математические обозначения

Mathematical Symbols

Úřad pro normalizaci, Praha

20 str.
A5 (21 × 14.8 cm)
Kčs 5,

Zázn. č.
1325. 1961

Стандарт содержит в табличном порядке обозначения и их формулировку (или же значение и термин) для арифметики и алгебры, геометрии, математического анализа, векторов и основ матричного расчета. Стандарт дополнен общими инструкциями по печатанию знаков и их размещению в математических выражениях.

The standard contains table arrangement of symbols and their pronunciation (eventually meaning and name) for arithmetics, algebra, geometry, mathematical analysis, vectors, and principles of matrix algebra. It is completed with general instructions for pressing of symbols and their places in mathematical formulae.

(46) UNE

513:003.62

Geometric symbols

UNE 5 028 (1958)

INSTITUTO NACIONAL
DE RACIONALIZACION DEL TRABAJO, ESPAÑA

A4 (210 x 297)

Card No.

2 p
9.- pts

813

511.135.6 (469) IGPAI

Arredondamento dos valores numéricos

NP-37 (1957)

Arrondissement des valeurs numériques

Inspecção-Geral dos Produtos Agrícolas e Industriais

3 p

A4 (210×297 mm)

5 Esc.

Ficha N.º 35. 1962

Règles d'arrondissement des valeurs numériques.

[Группа А19] CDU 662.6.017:543.848 СССР

Угли бурые, каменные, антрацит, горючие сланцы и торф. МЕТОДЫ ОПРЕДЕЛЕНИЯ СОДЕРЖАНИЯ ХЛОРА

Brown coals, hard coals, anthracite, combustible shale and turf. Method for the determination of chlorine content

ГОСТ 9326—60 Утв. 13/I 1960 г. Введ. 1/VI 1960 г.

8 стр.
ф 144×203
25 коп.

Карт. № 6

Комитет стандартов, мер и измерительных приборов при Совете Министров Союза ССР

511.1 (480) SFS

Lukuarvojen tasoitus

Avrundning av siffertal

SFS A.I.25 (1948)

Rules for rounding of numerical values

Suomen Standardisoimisliitto r.y.
Finlands Standardiseringsförbund r.f.

A4 (21 x 29,7 cm)

1 p

mk 50:-

Card No 534

51:003.6 (481) NSF

Matematiske tegn

(Mathematical Symbols)

NS 30[illegible] - 1950

Norges Standardiserings-Forbund, Oslo

1 p.
A4: 21 x 29,7
N.kr. 1.-

Norge
Card No 44

Mathematical Symbols

721.013 : 624.083 (495) ENO

Η συσχετισμένη τυποποίηση των δομικών στοιχείων. Ορολογία

ENO P 01-002 (1959)

Modular coordination in building Terminology

ΕΛΛΗΝΙΚΗ ΕΠΙΤΡΟΠΗ ΠΡΟΤΥΠΟΠΟΙΗΣΕΩΣ
GREEK STANDARDS COMMITTEE

3pp
A4 (21X29,7 cm)
Dr. 10

Card No
12. 1963

614.898 : 621.039.58 (498) STAS

Protecţia împotriva radiaţiilor nucleare. Doze maxime permise

STAS 5942—62, U 62, înlocuieşte STAS 5942—58

Защита от ядерных излучений. Максимально допустимые дозы облучения

Protection contre les radiations nucléaires. Doses maxima admises

Oficiul de Stat pentru Standarde

4 pag.
A4 (21×29,7 cm)
Lei 1,00

Romînia
Fişa nr. 6304. 1963

543.05:669.15'74-198 (52) JISC

フエロマンガンのサンプリング方法

Methods for Sampling of Ferromanganese

JIS G 1511 (1962)

6 pages
A4(210x297)
45 yen

Card No. 6371

Japanese Industrial Standards Committee

Applicable to method for sampling and sample preparation for determination of average quality of one lot of ferromanganese in JIS G 2301. Embracing method of formation of lot, sampling method, sample preparation and method of determination of quality.

665.5:518:389.16 (73) ASA

ASTM-IP Petroleum Measurement Tables
ASA Z11.83-1956; ASTM D 1250-56 supersedes Z11.83-55; ASTM D 1250-55

(over)

Card No. 487-1960

American Standards Association, Incorporated
70 East 45th Street
New York 17, N.Y.

Tables for use in calculation of quantities of crude petroleum and petroleum products at required conditions in any of three widely used systems of measurement. Tables are provided over normal operating ranges for the reduction of gravity and volume to standard states, for calculation of weight-volume relationships, and interconversion of wide variety of commercially useful units. Issued in three volumes, covering U.S., British & Metric systems of measurement. American edition, 529 pages, $8.75; British edition, 431 pages, $7.00 Metric edition, 467, $7.70; Tables, 1 pg, 30¢

ANNEX 3

First and last pages of NEN 2391 (1962 and 1974) illustrating change of layout

NED. MIJ. VOOR NIJVERHEID EN HANDEL | KON. INSTITUUT VAN INGENIEURS

NEDERLANDS NORMALISATIE-INSTITUUT

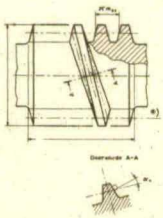
Doel

Deze norm vermeldt de gegevens en de wijze van aangeven ervan op tekeningen, die naast de gebruikelijke aanduidingen voor de afmetingen, het materiaal, de behandeling en dergelijke, nodig zijn voor het vervaardigen van worm en wormwiel.

Algemeen

Afhankelijk van de fabricagemethode kan de worm verschillende flankvormen krijgen. Het verdient daarom aanbeveling de fabricage van worm en van wormwiel aan dezelfde leverancier op te dragen.

Gegevens voor de worm



aantal gangen	
axiale modulus [1]	mm
steekcirkelmiddellijn	mm
drukhoek [2]	graden
tandhoogte [3]	mm
spoed	mm
spoedhoek	graden
gangrichting [4]	het niet-gewenste doorhalen links / rechts
maat voor de tanddikte met toelaatbare maatafwijking [5]	mm
6)	
tekeningnummer van het samenwerkende wormwiel	
hartafstand van worm en wormwiel (na inbouw) met toelaatbare maatafwijking	mm

*) de ruwheid van de tandflank wordt met een symbool volgens NEN 630 1 ... V op de steekcirkel aangegeven.

1) Onder axiale modulus m_{ax} wordt verstaan de modulus in een vlak door de as van de worm.

2) Onder drukhoek wordt verstaan de drukhoek in een vlak loodrecht op de richting van de gangen. Afhankelijk van de ideposseing en de bewerkingsmethode komen drukhoeken van $\alpha_n = 15°$ en $= 20°$ veel voor, zie figuur.

3) De tandhoogte is niet genormaliseerd. Bij kleine spoedhoeken is deze 2,167 ... 2,3 maal de waarde van de axiale modulus, waarbij de kophoogte gelijk is aan de axiale modulus.

4) bij voorkeur rechts

5) Een maat volgens één van de volgende meetmethoden vermelden:
a. de maat over de meetpennen, tevens met opgave van de middellijn van de pen of de kogel;
b. de tandkoorde, gemeten in een vlak loodrecht op de gangrichting, met opgave van de afstand van de tandkoorde tot de topcirkel.

6) Aanvullende gegevens voor bijzondere gevallen kunnen op deze plaats worden vermeld.

Worm en wormwiel Vermelding van gegevens op tekeningen	NEN 2391
Worm and wormgear. Data on drawings	februari 1962
Auteursrechten voorbehouden	UDC 744.4:621.833.36

UDC 621.833.382 383.744.4

Wormen en wormwielen Vermelding van gegevens op tekeningen Worms and wormwheels. Information to be given on drawings	NEDERLANDSE NORM NEN 2391 2e druk, augustus 1974

1. **Onderwerp**

Deze norm geeft aan welke gegevens moeten worden vermeld op tekeningen van wormen en wormwielen, die nodig zijn naast de gebruikelijke aanduidingen voor de afmetingen, het materiaal, de behandeling en dergelijke. Voor elk afzonderlijk geval kunnen daaraan de gegevens worden toegevoegd die noodzakelijk of nuttig worden geacht.

2. **Toepassingsgebied**

De norm is van toepassing op tekeningen voor het bestellen c.q. vervaardigen van wormen en wormwielen.

3. **Wormen**

3.1 *Op de tekening te vermelden hoofdafmetingen en kenmerken*

- topcirkelmiddellijn
- lengte van de worm
- middellijn van de ashalzen of van een eventueel ander gebruikscentreervlak
- gebruiksteunvlak
- maat-, vorm- en plaatstoleranties bij de hierboven genoemde gegevens
- oppervlakteruwheid van de tandflank en eventueel van het bodemvlak en de voetafrondingen.

3.2 *In een tabel op te nemen gegevens*

De hieronder vermelde gegevens dienen bij voorkeur in de rechter bovenhoek van de tekening te worden vermeld.

- axiale modulus
- aantal tanden
- referentiecirkelmiddellijn (nauwkeurig tot op 0,001 mm)
- theoretisch heugelprofiel (nummer van de betrokken norm[1]) en de daarin vastgelegde drukhoek van het gereedschap; indien afwijkend, moeten de kenmerken worden opgegeven, bij voorkeur door middel van een figuur van dat profiel).
- flankvorm[2])
- tandhoogte
- spoed
- spoedhoek
- tandrichting (deze moet worden aangegeven met behulp van een symbool volgens NEN 74 in een afzonderlijke tekening volgens de verleenvoudigde tekenwijze)

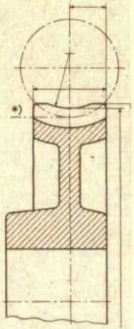
Opmerking
De tandrichting is bij voorkeur rechts.

- tanddikte: nominale waarde en toelaatbare maatafwijkingen; het verdient aanbeveling om in plaats van de tanddikte te vermelden, hetzij
  - de diametrale rollen- of kogelmaat met opgave van de middellijn van pen of kogel, hetzij
  - de tandkoorde, gemeten in een vlak loodrecht op de tand, met opgave van de afstand van de tandkoorde tot de topcirkel
- flankspeling (in plaats van de flankspeling kan ook de hartafstand tussen worm en wormwiel bij spelingvrij ingrijpen onder de nominale ashoek worden opgegeven)

[1] Nog geen Nederlandse norm beschikbaar.
[2] Bij voorbeeld: A, K, E of N volgens DIN 3975

Deze norm is opgesteld door commissie 5 (Tandwielen).

Gegevens voor het warmwiel



aantal tanden	1)	
axiale modulus van de worm	2)	mm
steekcirkelmiddellijn		mm
drukhoek	3)	graden
tandhoogte	4)	mm
profielverschuivingsfactor	5)	
flankspeling met toelaatbare maatafwijking	6)	mm
	7)	
aantal gangen van de worm		
steekcirkelmiddellijn van de worm		mm
spoedhoek van de worm		graden
richting van de gangen van de worm		het niet-gewenste doorhalen links / rechts
tekeningnummer van de samenwerkende worm		
hartafstand van worm en warmwiel (na inbouw) met toelaatbare maatafwijking		mm

*) de ruwheid van de tandflan wordt met een symbool volgens NEN 630 1 ... V op de steekcirkel aangegeven.

1) Bij het gebruik van meergangige wormen dient bij voorkeur het aantal tanden van het warmwiel niet deelbaar te zijn door het aantal gangen van de worm.

2) Onder axiale modulus m_{ax} wordt verstaan de modulus in een vlak door de as van de worm.

3) Als drukhoek voor het warmwiel geldt de drukhoek van de worm.

4) De tandhoogte is niet genormaliseerd. Bij kleine spoedhoeken is deze 2,167 ... 2,3 maal de waarde van de axiale modulus van de worm.

5) De profielverschuivingsfactor is de profielverschuiving, gedeeld door de axiale modulus.

6) In plaats van de flankspeling kan ook worden opgegeven: de hartafstand tussen worm en warmwiel bij spelingvrij ingrijpen.

7) Aanvullende gegevens voor bijzondere gevallen kunnen op deze plaats worden vermeld.

Opmerking

Het is wenselijk, in de figuur het uitgangsvlak voor het spannen bij het vertanden aan te geven en ervoor te zorgen dat het desbetreffende vlak bij symmetrische warmwielen op één of andere wijze wordt gemerkt.

De normen en de catalogus van normen, alsmede inlichtingen hierover en over de normalisatie in het algemeen zijn verkrijgbaar bij het Nederlands Normalisatie-instituut, postbus 70, 's-Gravenhage, Duinweg 20-22, telefoon (070) 51 40 41*, postrekening 25301.

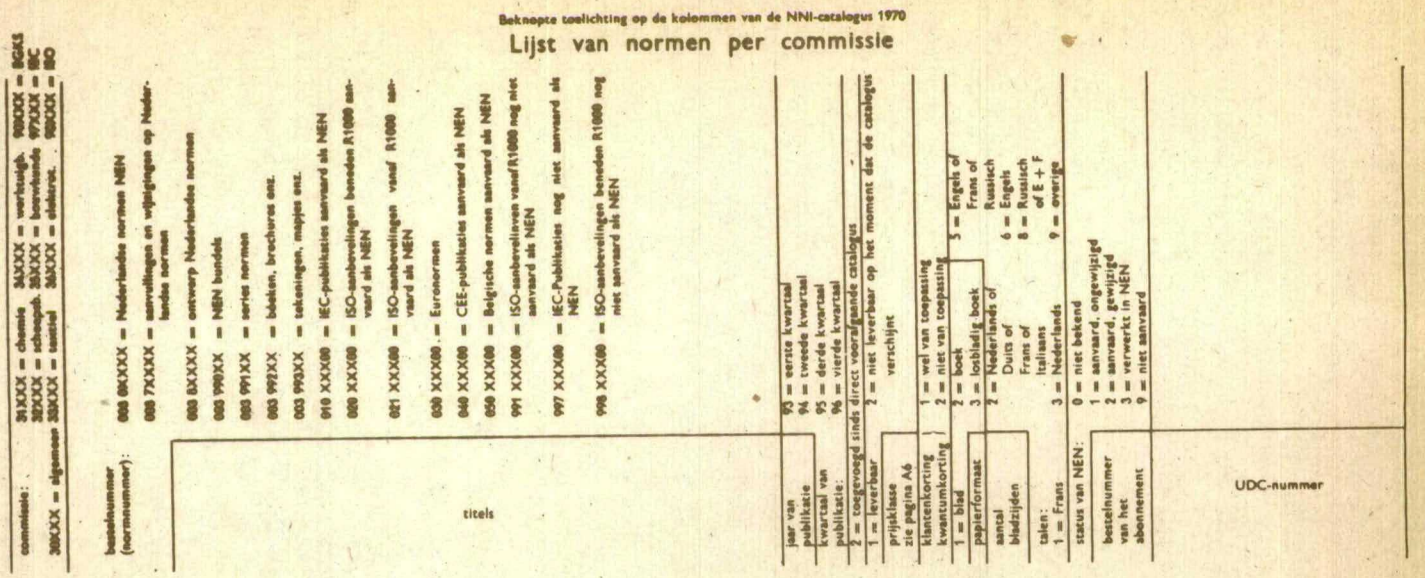
Opmerkingen

1. De 1e druk van deze norm is verschenen in februari 1972.
   Wijzigingen ten opzichte van de 1e druk:
   a. opsommingen van de op de tekeningen en in de tabellen op te nemen gegevens zijn toegevoegd;
   b. de volgorde van de gegevens in de tabellen is gewijzigd;
   c. in de tabel voor de worm zijn de flankvorm en de nauwkeurigheid toegevoegd;
   d. in de tabel voor het wormwiel zijn de flankvorm van de worm en de nauwkeurigheid toegevoegd;
   e. de op de worm betrekking hebbende termen „aantal gangen" en „steekcirkelmiddellijn" zijn gewijzigd in resp. aantal tanden en referentiecirkelmiddellijn.
2. Titels van vermelde normen:
   NEN 74 – Technische tekeningen. Tekenwijze van tandwielen
   DIN 3975 – Verzahnungen. Bestimmungsgrössen und Fehler an Zylinderschneckentrieben. Grundbegriffe

Normcommissie 340 05 „Tandwielen"

Nederlands Normalisatie-instituut
Polakweg 5, Rijswijk (ZH), telefoon (070) 90 68 00*, telex 32123, postrekening 25301

Prijsklasse 16



Beknopte toelichting op de kolommen van de NNI-catalogus 1970

Lijst van normen per commissie

commissie: 31XXX = chemie 34XXX = veiligh. 900XX = BGAS
32XXX = scheepsb. 35XXX = bouwkunde 97XXX = IEC
30XXX = algemeen 33XXX = textiel 36XXX = diskrim. 98XXX = ISO

bestelnummer (normnummer):
- 003 00XXXX = Nederlandse normen NEN
- 003 7XXXXX = aanvullingen en wijzigingen op Nederlandse normen
- 003 8XXXXX = ontwerp Nederlandse normen
- 003 990XX = NEN bundels
- 003 991XX = series normen
- 003 992XX = boeken, brochures enz.
- 003 993XX = tekeningen, mappen enz.
- 010 XXX00 = IEC-publikaties aanvaard als NEN
- 020 XXX00 = ISO-aanbevelingen boneden R1000 aanvaard als NEN
- 021 XXX00 = ISO-aanbevelingen vanaf R1000 aanvaard als NEN
- 030 XXX00 = Euronormen
- 040 XXX00 = CEE-publikaties aanvaard als NEN
- 050 XXX00 = Belgische normen aanvaard als NEN
- 991 XXX00 = ISO-aanbevelingen vanaf R1000 nog niet aanvaard als NEN
- 997 XXX00 = IEC-Publikaties nog niet aanvaard als NEN
- 998 XXX00 = ISO-aanbevelingen boneden R1000 nog niet aanvaard als NEN

titels

jaar van publikatie
kwartaal van publikatie:
- 93 = eerste kwartaal
- 94 = tweede kwartaal
- 95 = derde kwartaal
- 96 = vierde kwartaal

2 = toegevoegd sinds direct voorafgaande catalogus
1 = leverbaar — 2 = niet leverbaar op het moment dat de catalogus verschijnt

prijsklasse zie pagina A6

klantenkorting / kwantumkorting
- 1 = wel van toepassing
- 2 = niet van toepassing

1 = blad — 2 = boek — 3 = losbladig boek

papierformaat

aantal bladzijden

talen:
- 1 = Frans
- 2 = Nederlands of Duits of Frans of Italiaans
- 3 = Nederlands
- 5 = Engels of Frans of Russisch
- 6 = Engels
- 8 = Russisch of E + F
- 9 = overige

status van NEN:
- 0 = niet bekend
- 1 = aanvaard, ongewijzigd
- 2 = aanvaard, gewijzigd
- 3 = verwerkt in NEN
- 9 = niet aanvaard

bestelnummer van het abonnement

UDC-nummer

C 64

Lijst van normen per commissie

commissie	bestelnummer (normnummer) 003 = NEN zie verder blz. A5	titels	jaar / kwartaal van publikatie	gewijzigd / leverbaar	prijsklasse	klanten / kwantum korting	blad, boek, papierformaat	aantal bladzijden	talen	status van NEN	bestelnummer van het abonnement	UDC-nummer
98046		DOCUMENTATION										
98046	991 08600	TITLE=LEAVES OF A BOOK,	69 94	21	9	22	14	8 500			002 651 05	/655
98046	998 00400	INTERNATIONAL CODE FOR THE ABBREVIATION OF TITLES OF PERIODICALS	54 93	11	8	22	14	4 500	3		05	
98046	998 00800	LAYOUT OF PERIODICALS	55 96	11	10	22	14	8 500	8		651 05	/655

98046	998 00900	INTERNATIONAL SYSTEM FOR THE TRANSLITERATION OF SLAVIC CYRILLIC CHARACTERS (MET ERRATA)	68 94 21	13 22 14	8 500		003		
98046	998 01800	SHORT CONTENTS LIST OF PERIODICALS OR OTHER DOCUMENTS	56 94 11	6 22 14	4 500		05		
98046	998 03000	BIBLIOGRAPHICAL STRIP	56 96 11	8 22 14	4 500	3	05		
98046	998 07700	BIBLIOGRAPHICAL REFERENCES, ESSENTIAL CLEMENTS	58 96 11	12 22 14	8 500	3	02		
98046	998 16900	SIZES OF PHOTOCOPIES (ON PAPER) READABLE WITHOUT OPTICAL DEVICES	60 96 11	6 22 14	4 500		77		
98046	998 19300	MICROCOPIES ON TRANSPARENT BASES, SIZES OF RECOMMENDED BASES	61 93 11	6 22 14	4 500		77		
98046	998 21400	ABSTRACTS AND SYNOPSES (MET AMENDMENT 1968)	61 96 11	8 22 14	4 500	3	05		
98046	998 21500	PRESENTATION OF CONTRIBUTIONS TO PERIODICALS	61 96 11	8 22 14	4 500		05		
98046	998 21800	MICROCOPIES, SCALE OF 35 MM MICROFILMS FOR INTERNATIONAL EXCHANGE	61 96 11	8 22 14	4 500		77		
98046	998 23300	INTERNATIONAL SYSTEM FOR THE TRANSLITERATION OF ARABIC CHARACTERS	61 96 11	13 22 14	8 500		003		
98046	998 25900	TRANSLITERATION OF HEBREW	62 94 11	12 22 14	8 500		003		
98046	998 26000	TERMS RELATING TO MICROCOPIES AND THEIR BASIS	62 94 11	8 22 14	4 500		77 001,4		
98046	998 37100	TERMS RELATING TO MICRO COPY APPARATUS	64 95 11	6 22 14	4 500		77		
98046	998 43500	ISO CONVENTIONAL TYPOGRAPHICAL CHARACTER FOR LEGIBILITY TESTS (ISO CHARACTER)	65 94 11	10 22 14	8 500		651 676	/655	
98046	998 44600	MICROCOPIES, LEGIBILITY TESTS, DESCRIPTION OF THE ISO MIRE (ISO TEST OBJECT) AND ITS USE IN PHOTOGRAPHIC DOCUMENT REPRODUCTION	65 95 11	12 22 14	8 500		77		
98046	998 45200	ESSENTIAL CHARACTERISTICS OF 35 MM MICROFILM READING APPARATUS	65 96 11	9 22 14	8 500		77		
98046	998 68900	MICROSCOPIES, LEGIBILITY TESTS, DESCRIPTION AND USE OF THE ISO MICRO-MINE (ISO MICRO TEST OBJECT) FOR CHECKING A READING APPARATUS	68 93 11	12 22 14	8 500		77		
98046	998 69000	BIBLIOGRAPHICAL REFERENCES, ESSENTIAL AND SUPPLEMENTARY ELEMENTS	68 93 11	23 22 14	16 500		001		
98046	998 78200	MICROSCOPY, MEASUREMENT OF THE SCREEN LUMINANCE OF MICRO-FILM READERS	68 95 11	12 22 14	8 500		77		
98046	998 83200	ABBREVIATIONS OF TYPICAL WORDS IN BIBLIOGRAPHICAL REFERENCES,	68 95 21	56 22 14	48 800		02 003		
98046	998 83300	ABBREVIATIONS OF GENERIC NAMES IN TITTLES OF PERIODICALS	68 95 11	44 22 14	36 800		001,4 05		
98046	998 84300	INTERNATIONAL SYSTEM FOR THE TRANSLITERATION OF GREEK CHARACTERS INTO LATIN CHARACTERS	68 96 11	9 22 14	8 500		678,5	/678,8	
98046	998 99900	INDEX OF A PUBLICATION,	69 93 21	8 22 14	4 500		002 651	/655	
98047		CHEMISTRY							
98047	998 07800	GUIDE ON THE FORM FOR STANDARDS FOR CHEMICAL PRODUCTS AND FOR METHODS OF CHEMICAL ANALYSIS	58 96 11	23 22 14	16 500	3	54		
98047	998 73100	FORMIC ACID INDUSTRIAL USE, METHODS OF TEST	68 94 11	14 22 14	12 500		661,7		
98047	998 73900	SODIUM CARBONATE FOR INDUSTRIAL USE, PREPARATION AND STORAGE OF TEST SAMPLES	68 94 11	6 22 14	4 500		661,8		
98047	998 74000	SODIUM CARBONATE FOR INDUSTRIAL USE, DETERMINATION OF TOTAL SOLUBLE ALKALINITY, VOLUMETRIC METHOD	68 94 11	8 22 14	4 500		661,8		
98047	998 74100	SODIUM CARBONATE FOR INDUSTRIAL USE, DETERMINATION OF SODIUM HYDROGEN CARBONATE VOLUMETRIC METHOD	68 94 11	9 22 14	8 500		661,8		
98047	998 74200	SODIUM CARBONATE FOR INDUSTRIAL USE, DETERMINATION OF CHLORIDE CONTENT, VOLHARD VOLUMETRIC METHOD	68 94 11	10 22 14	8 500		661,8		

NNI Catalogue 1972, illustrative page 158 of numeric list

	normnummer	jaar	titel	prijs-klasse	omvang		volgorde-nummer
1161	NEN 1555	71	Zeskantbouten. Metrische schroefdraad. Uitvoering m en mg	12	4	A4	193
1162	V 1556	-	Ingetrokken	-	-		
1163	V 1557	-	Ingetrokken	-	-		
1164	N 1558	-	Ingetrokken	-	-		
1165	V 1559	-	Ingetrokken	-	-		
1166	NEN 1560	68	Zeskantmoeren. Metrische schroefdraad. Uitvoeringen m en mg	8	2	A4	208
1167	N 1561	54	Natuursteen. Steenstukken en steenslag voor wegverharding. Algemene bepalingen en keuringseisen	8	2	A4	245
1168	N 1562	54	Natuursteen. Keuringsproeven	8	2	A4	245
1169	NEN 1563	64	Voorschriften voor de bepaling van het vetgehalte van karnemelk en gezuurde ondermelk volgens de butyrometrische methode van Gerber	8	2	A4	315
1170	V 1564	-	Vervangen door NEN 1560	-	-		
1171	V 1565	-	Vervangen door NEN 1555	-	-		
1172	V 1566	-	Ingetrokken	-	-		
1173	V 1567	-	Vervangen door V 969	-	-		
1174	NEN 1568	68	Zeskantbouten met schroefdraad over de volle lengte van de steel. Metrische schroefdraad. Uitvoering m en mg	12	4	A4	193
1175	V 1569	-	Vervangen door NEN 1568	-	-		
1176	NEN 1570	71	Enkele veerringen, gewelfd of gegolfd	8	2	A4	212
1177	NEN 1571	67	Drukmeetnippels voor gas	8	2	A4	155
1178	V 1572	-	Vervangen door N 944	-	-		
1179	N 1573	-	Vervangen door NEN 2503	-	-		
1180	V 1574	-	Vervangen door N 944	-	-		
1181	N 1575	-	Vervangen door NEN 2504	-	-		
1182	N 1576	-	Vervangen door NEN 2505 en NEN 2506	-	-		
1183	N 1577	-	Ingetrokken	-	-		
1184	N 1578	53	Rubber pakkingringen voor schuifmofverbindingen van gasleidingen	8	2	A4	80
1185	N 1579	53	Rubber pakkingringen voor schroefmofverbindingen van gasleidingen	8	2	A4	80
1186	NEN 1580	58	Transportvaten. Lichte stalen vaten	8	2	A4	132
1187	NEN 1581	60	Freesbevestiging. Aansluitmaten van freespennen	8	2	A4	73
1188	NEN 1582	60	Freesbevestiging. Meeneemringen	8	2	A4	73
1189	NEN 1583	60	Freesbevestiging. Schroeven voor freespennen	8	2	A4	73
1190	NEN 1584	65	Mantelkopfrezen, snelstaal. Hoofdafmetingen	8	2	A4	225
1191	NEN 1585	65	Mantelkopfrezen, hardmetaal. Hoofdafmetingen	8	2	A4	225
1192	Ontw. 1586	-	Vervangen door NEN 1585	-	-		
1193	NEN 1587	66	Schijffrezen, snelstaal. Hoofdafmetingen	8	2	A4	225
1194	NEN 1588	66	Schijffrezen, hardmetaal. Hoofdafmetingen	8	2	A4	225
1195	N 1589	52	Richtlijnen voor bovenleidingen en voedingsnetten voor gelijkstroomtrolleybussen. Aanleg en onderhoud	8	2	A4	119
1196	N 1590	-	Vervangen door NEN 2503	-	-		
1197	N 1591	53	Gesulfateerd cement. Definitie en keuringseisen	8	2	A4	13 15 385
1198	V 1592	55	Mortels voor metselwerk en voor voegwerk	8	2	A4	385
1199	Ontw. 1593	-	Ingetrokken	-	-		
1200	NEN 1594	63	Brandbeveiliging van gebouwen. Droge stijgleidingen	8	2	A4	60
1201	Ontw. 1595	-	Vervangen door NEN 3089	-	-		
1202	V 1596	-	Vervangen door NEN 3089	-	-		
1203	N 1597	55	Telecommunicatie. Telegrafie, telefonie en signalering. Kleuren voor de aders van binnenkabels en voor montagedraden	8	2	A4	82
1204	Ontw. 1598	61	Gebakken bloempotten	4	2	A4	306
1205	N 1599	-	Ingetrokken	-	-		
1206	NEN 1600	67	Hardmetaal voor verspanend gereedschap. Indeling en aanduiding	12	4	A4	82
1207	NEN 1601	71	Lage cilinderkopschroeven met binnenzeskant	8	2	A4	199
1208	NEN 1602	70	Cilinderkopschroeven met kleine kop met zaagsnede	12	4	A4	199
1209	NEN 1603	70	Cilinderkopschroeven met grote kop met zaagsnede	12	4	A4	199
1210	NEN 1604	-	Ingetrokken	-	-		
1211	NEN 1605	68	Onderzoekingsmethoden voor oliehoudende zaden, vruchten en schroten	12	4	A4	376

NV PHILIPS-ELECTROLOGICA ANNEX 6: Sales analysis by computer, illustrative page.

NEDERLANDS NORMALISATIE INSTITUUT, RIJSWIJK OMZETSTATISTIEK ARTIKELNR./KLANTNR.

LC	ART NR.	CAT	KLANT NR.	KLANTNAAM	KWARTAAL I AANTAL	KWARTAAL I BEDRAG	KWARTAAL II AANTAL	KWARTAAL II BEDRAG	KWARTAAL III AANTAL	KWARTAAL III BEDRAG	KWARTAAL IV AANTAL	KWARTAAL IV BEDRAG	JAAR 1969 AANTAL	JAAR 1969 BEDRAG	FAKTUUR REGELS
20		22			1	4,50									1
	36200				1	4,50									1
	45800	22	2507	HAZEMEYER	1	9,00									
		22			1	9,00									1
	45800				1	9,00									1
	46200	22	2507	HAZEMEYER	-3	0,00									
		22			-3	0,00									3
	46200				-3	0,00									3
	47200	22	2507	HAZEMEYER		0,00									
		22				0,00									1
	47200					0,00									1
	48300	10	8199	DIVERSEN	2	18,00									
		10			2	18,00									2
	48300	22	2507	HAZEMEYER	1	9,00									
		22	5199	TNO	2	18,00									
		22			3	27,00									3
	48300				5	45,00									5
	48400	22	5133	MV V BUITENG	1	12,00									
		22			1	12,00									1
	48400				1	12,00									1
	52700	10	4112	HTS BOSCH	1	12,00									
		10			1	12,00									1
	52700	22	2107	HAZENEYER	1	24,00									
		22			1	24,00									3
	52700				2	36,00									4
	69400	22	168	BIESBOSCH	1	7,50									
		22	815	CROON	2	15,00									
		22	155	DROOGDOK AD	1	7,50									
		22	156	DROOGDOK RD	1	7,50									
		22	194	DUYNENDYKS	1	7,50									
		22	2104	GIESSEN-DE N	2	15,00									
		22	2196	GROOTAVLIET	1	7,50									
		22	2762	IHC-HOLLAND	1	7,50									
		22	2152	JAVA CHINA-	1	7,50									
		22	2161	JONG NV	1	7,50									
		22	3147	NED NV STOOM	4	30,00									
		22	3711	NN-NED SCHW	1	7,50									
		22	4114	SANDER NV	2	15,00									
		22	4161	SCHELDE IJ-U	2	15,00									
		22	4173	SVAAIJ AIRCO	-1	0,00									
20		22	5167	VOLKSHV ST K	1	7,50									
		22	5191	VOORUITGANG	1	7,50									
		22	5128	VUYKAZN	2	15,00									
		22	5172	WIJSMULLER	1	7,50									
		22	5143	ZAANL SCHEEP	1	7,50									
		22			26	202,50									24
	69400	30	100	AMELS	2	15,00									
		30	149	ARNH SCHEEPS	2	15,00									
		30	151	BOOT NV	4	30,00									
		30	8199	DIVERSEN	12	90,00									
		30			20	150,00									17
	69400				46	352,50									41
20					79	578,25									84

0=not included
1=included
-=not applicable
=not known or not relevant
x=multiple of

ANNEX 7 (Copied from original)

Rough Draft of Working Paper (unchecked)

CONTENTS OF STANDARDS CATALOGUES

Inventory of basic information aspects of a few 1969 or 1970 standards catalogues; also draft for the contents of a proposal for a future harmonized westeuropean catalogue

BASIC INFORMATION ASPECT AS RECORDED IN CATALOGUE	FRANCE	BELGIUM	NETHERLANDS	GERMANY	UNITED KINGDOM	SWEDEN	IEC	ISO	West Europe: DRAFT SPACE FOR INDICATING PREFERENCE	West Europe: DRAFT PRELIMINARY CONTENTS AGREED CONTENTS (SPARE)	Number of print positions required: FRANCE	BELGIUM	NETHERLANDS	GERMANY	UNITED KINGDOM	SWEDEN	IEC	ISO	WESTERN EUROPE STANDARD CATALOGUE
1.00 Per item (information recorded seperately for each standard in catalogue)	-	-	-	-	-	-	-	-					134						
1.01 registration number of standardization proposal or draft	0	0	0	0	0	0	0	1					-) essential						
1.02 number of standard (or other item)	1	1	1	1	1	1	1	1	-				8						
1.03 title of standard in national language	1	1	1	1	1	1	1	1	-				x57						
1.04 title of standard in some ISO language	1	1	0	0	1	1	1	1	-										
1.05 subject as printed on standard	0	0	0	0	0	0	1	0											
1.06 field of application as printed on standard	1	0	0	0	0	0	1	0	-	decision later									
1.07 abstract	0	0	0	0	1	0	0	0	-										
1.08 date of publication:																			
- year	1	1	1	1	1	0	1	1	-				2						
- quarter of a year	0	0	1	0	0	0	0	0					2						
- month	1	0	0	1	0	0	0	0											
1.09 date of withdrawal of standard	1	0	0	0	1	0	0	0											
1.10 accepted/altered rejected as national standard	0	0	1	0	1	0	-	-					1						
1.11 correction, supplement etc.	1	1	1	1	1	0	1	1	-				(1)						
1.12 (not)changed since publication of last edition of catalogue	1	0	1	0	0	0	1	0					1						
1.13 UDC number:																			
- first	0	1	1	1	1	0	0	1	-decision in due course				x23						
- second																			
- third																			
1.14 simplified division of UDC	1	0	1	1	1	0	0	0	-decision in due course				x5						
1.15 standardization committee of the institute	0	0	1	0	1	0	0	1					5						
1.16 standardization committees of other organizations	0	1	0	1	0	0	-	-											
1.17 department of standardization office		0	0	0	0	0	0	0											
1.18 number of sheets of standard	1	0	1	0	1	1	1	0					3						
1.19 size of paper of standard	0	0	1	0	0	0	0	0					1						
1.20 leave, book, looseleave book	0	0	1	0	0	0	0	0					1						
1.21 languages used in standard etc. and/or	0	1	1	0	0	0	0	0					1						
1.22 languages wherein standard sold	0	1	1	1	0	1	0	0											
1.23 price of standard	1	1	0	0	1	1	1	1					(1)						
1.24 priceclass of standard	0	1	1	1	0	0	0	0	5 decision in due course										
1.25 price of complete collections of standards (see also under 3)	0	0	0	0	0	0	0	0					3						
1.26 price of special groups of standards	0	0	1	0	0	0	0	0					(3)						
1.27 applicability of rebate based on quantity per standard (note: for rebate based on quantity per invoice see under 3)	0	0	1	0	0	0	0	0					1						
	-	-	-	-	-	-	-	-											
1.28 applicability of rebate based on category of customer	0	0	1	0	0	0	0	0					1						
1.29 voluntary or mandatory standard	0	1	0	0	1	0	-	-					- Essential						
2.00 Sequences (of complete standard lists)	-	-	-	-	-	-	-	-											
2.01 according to number of standard	1	1	1	1	1	1	1	1	-										
2.02 according to UDC number	0	1	1	1	1	0	0	1											
- closed by number of standard			1	1															
2.03 according to subdivision of UDC	0	0	0	1	1	0	0	0											
- closed by number of standard				1															
2.04 according to (number of) standardization committee	0	0	1	0	0	1	0	1											
- closed by standard number			1	0															

2.05	according to product group	1	0	0	0	1	1	0	0		
2.06	selection of consumer standards following ISO advise	0	0	1	0	1	0	0	0		
	- according to standard number	0	0	0	0	1					
2.07	list of standards withdrawn	1	0	1	1	1	0	0	0		
	- according to standard number	1	0	1	0						
2.08	selection of mandatory standards	0	1	0	0	0	0	-	-		
2.09	alphabetical list of keywords referring to:	1	1	1	1	1	1	1	1	-	
2.10	- standard number	1	1	0	0	1	1	1	0	-	
2.11	- UDC number	0	1	1	0	0	0	0	0		
2.12	- UDC subdivision	0	0	0	1	0	0	0	0		
2.13	- standardization committee (number)	0	0	1	0	0	1	0	0		
2.14	- product group	1	0	0	0	0	1	0	0	Essential. Choice later	
2.15	- page of catalogue	0	0	1	0	0	0	0	1		
2.16	- page in standard number sequence	0	0	0	0	0	0	0	0		
2.17	- page in UDC sequence	0	0	1	0	0	0	0	0		
2.18	- page in committee sequence	0	0	1	0	0	0	0	0		
2.19	- page in consumer list	0	0	0	0	0	0	0	0	-	
2.20	- page in "withdrawn" list	0	0	0	0	0	0	0	0		
2.21	advertisements on standards	1	0	0	1	0	0	0	0		
2.22	advertisements on other products	1	1	0	0	0	0	0	0		
2.23	list of firms advertising in catalogue	1	0	0	0	0	0	0	0		
3.00	Introductory text, cover, inserts etc.	-	-	-	-	-	-	-	-		
3.01	streetmap showing institutes address	0	0	1	0	0	0	0	0		
3.02	contents of catalogue	1	1	1	1	1	1	1	1	-	
3.03	pricesystem	0	1	1	1	0	1x)	0	0		
3.04	-per customer category	0	0	1	0	0	0	0	0		
3.05	abbreviations used in catalogue	1	1	1	1	1	1	0	0	-	
3.06	explanation	-	-	-	-	-	-	-	-		
3.07	-of codes used in catalogue	1	0	1	1	0	1	0	0	-	
3.08	-of quantity rebate	1	1	1	1	0	1x)	0	0	-	
3.09	-of customer rebate	1	1	1	1	1	1x)	0	0	-	
3.10	-of rebate or handling cost per invoice	0	0	1	0	1	1x)	0	0	-	
3.11	-rebate for quick payment	0	0	1	0	0	0	0	0		
3.12	price of collections of standards (see also under 1)	0	0	0	0	1	1x)	0	0		
3.13	membership fees invited from members of the institute	0	1	1	1	0	0	0	0		
3.14	subscriptions to standards newly published	1	1	1	1	0	0	0	0		
3.15	(charge or none for) standards on loan	0	1	1	1	0	0	0	0		
3.16	orders for foreign standards	1	1	1	0	1	0	-	-	-	
3.17	copies of foreign standards in case of urgency	0	0	1	0	0	0	-	-	-	
3.18	foreign and international catalogues of standards	1	0	0	0	0	0	-	-		
3.19	standardization journals of the national institutes	1	1	1	1	1	0	-	-	-	
3.20	standardization journals -of foreign institutes and	0	0	0	0	0	0	0	0		
	-of international institutes	0	0	0	0	0	0	1	1		
3.21	aims and means of the institute	1	1	1	1	1	0	0	0		
3.22	licensing copying rights -charge for licensing	0	0	1 1	1	0	0	0	0	-	
4.00	International standards	-	-	-	-	-	-	-	-		
4.01	ISO standards, separate list concluded in catalogue	1	1	1	1	1	0	0	1	-	
4.02	ISO standards, integrated into sequences	0	1	1	0	1	0	0	-	-	
4.03	IEC standards, separate list	1	1	1	1	1	0	1	0	-	
4.04	IEC standards, integrated	0	1	1	0	1	0	-	0	-	
4.05	CEE standards, separate list	0	1	0	0	0	0	0	0		
4.06	CEE standards, integrated	0	1	0	0	0	0	0	0		
4.07	EURO standards, separate list	1	1	1	0	0	0	0	0		
4.08	EURO standards, integrated	0	1	1	0	0	0	0	0		
5.00	Size of catalogue	-	-	-	-	-	-	-	-		
5.01	size of pages (A4 or A5)	4	4	4	5	5	5	5	4		
5.02	number of pages, in hundreds	5	2	3	6	9	4	1	2		
5.03	number of items (standards etc.) in thousands	8	3	4	14	7	4	0,3	1		

x) Price list as a - Essential | loose leaf

ANNEX 8 (Copied from original)

INFCO/DNA Circular letter and answers by the ISO Central Secretariat.

3. DNA/INFCO Circular Letter No 3

3.1. General Information

The following questionnaire concerning software systems and information on data processing in the field of standardization was enclosed with DNA/INFCO Circular Letter No 3.

1. Common features of the system

1.1. What are the names of the system and the manufacturer or producer?
1.2. How much is the purchase-money or charge for hire of the system?
1.3. What expense of staff does the handling and maintenance require?
1.4.a) System has been developed or
b) completed version is in running order since?
1.5. Which systems (hard ware) are required?
1.5.1. What is the min-max configuration?
1.6. What is the core storage requirement?
1.7. Which capacity of processed information do you have?
1.8. What programming languages are used?

2. Types of processing of required information

2.1. Are there one or more disconnected programs or a software system, that few tuned programs working with each other do exist?
2.2. In case (in the way of 2.1.) a real sofware-system exists: does it concern with a
a) Information-retrieval-system?
b) Information-system?
c) Management-information-system?
d) Other information system?
e) Other software system?
2.3. Please give a short, but accurate description of functions of the system.

3. Data input

3.1. What requirement to the data are set (referring to content, length and format) processed by the system? Please send a data input form.
3.2. Which external procedures (e.g.punching following special machine regulations) are necessary to get the data prepared for the storing by the system?
3.3. How does the storing of data take place (by which programs in particular)?
3.4. What is the storing speed?
3.5. What storing medium do you use?
3.6. Have you any reasonableness check(s)?
3.7. Are reports (protocols) produced about receiving data?
3.8. Can structured data be processed?
If so, give details.

4. Storing of data (information)

4.1. Please describe the storage mediums (e.g.magnetic disc storage) with precise reference-number and characterizing hardware features (especially access speed, capacity, number of storage mediums to be connected with the system, possibilities of expanding) being used.
4.2. Please describe the structure and organization of files which hold the functions on the storage mediums mentioned before (point 4.1.)
4.2.1. Which access method (e.g.serial, sequential, index sequential) is used?
4.2.2. Give a short description of file structure with examples.
4.2.3. How will additional information be inserted into these files?
4.2.4. In case there are several files different in their structure: How do these files link together?
How does the cross-reference take place from one file to the next, logical (e.g.by algorithms)?

5. Kind of search keys being used

5.1. Which search keys are used to get an access on the stored information?
5.2. Must these search keys originate from an existing keyword-list or thesaurus?
5.3. Does it concern to hierarchical search keys, key-systems etc.?
5.4. Can relations be considered between serach keys (when storing) and retrieval of information?
5.4.1. Is it possible to set up synonymic, hierarchical and logical links in particular?
5.5. Is it possible to link search keys to one "search question"?
If so: Give examples for search questions.

6. Output of information

6.1. Which admissible output devices are possible?
Please send a data output form.
6.2. Is teleprocessing admissible? If so:
a) Required teleprocessing configuration?
b) Admissible terminals (teleprinter, display devices)?
c) How many terminals can be served simultaneously by the system?
d) Real-time system?
6.3. Are the output-informations still to be processed mechanically?

7. Updating

7.1. What is to be done to receive
a) stored informations
b) search keys
updated?
7.2. How are updatings listed?
7.3. In what respect several system's functions can work simultaneously during execution?
7.4. What time for updatings is required?

8. Special system features

8.1. Is the system to be modified?
If so: Give examples.
8.2. Is the system able to be expanded?
8.3. Which operating system is necessary for execution?
8.4. Has compatibility with any other system in particular been established?
If so, with which system or systems?

1 ---

2 ISO Central Secretariat

3 1. Common features of the system

1.1. IBM 360 - 40

1.2. We make use of the machines of the IBM Computer Centre and we pay for the jobs executed.

1.3. No expenses of staff are incurred. The handling and maintenance are done by staff of the IBM Computer Centre.

1.4. The system for Draft ISO Recommendations has been developed since September 1970. The system for standards since November 1971.

1.5. The 360 - 40 system running in O.S. mode is required.

1.5.1. Maximum : none
Minimum : 128 K of core
4 discs
6 tapes

1.6. The core storage requirement is about 40 K (out of 128 K).

1.7. The capacity of processed information is about 150.000 standards.

1.8. The programming language used is IBM COBOL F OS.

2. Type of processing of required information

2.1. 1288 program to optically read input forms.

2.2. A real software-system exists. It deals with another software-system than those mentioned in a - d.

2.3. A series of programs will list, sort and compare information on ISO and national standards. Included is a dictionary of descriptors with which an information retrieval system can be achieved.

3. Data input

3.1. An example of the optical reading input form is annexed (see page 70). There is also a facility for input by punched cards.

3.2. Typewriters with OCR-A Character sets, conforming to Recommendation ISO-R 1073, are used to type the information of standards on a preprinted IBM 1288 document.

3.3. Data are stored on magnetic tape.

3.4. The storing speed is 800 bites per inch.

3.5. Storing media used are magnetic tape and magnetic disc.

3.6. Many reasonableness checks are made. For input alone 14. Many others.

3.7. Check list are made each time of loading or updating.

3.8. No structured data can be processed.

4. Storing of data (information)

4.1. Storage medium of magnetic tape 2401 model 2 (sequential access): capacity of 6 tapes with unlimited expansion. Storage medium of magnetic disc 2311: capacity 7.500.000 characters per drive, with 5 drives available, giving a total of 37.500.000 characters available on-line. Access time 75 milliseconds.

4.2. Some files are organized sequentially, others are indexed sequentially.

4.2.1. Both the sequential and index-sequential method of access are used. The index-sequential method is a form of random access.

4.2.2. A description of the file structure is not available.

4.2.3. Additional information will be inserted into the files through update programs.

4.2.4. The files can be reorganized to sequential files and comparison can be made by the document identification.

5. Kind of search keys being used

5.1. Search keys used to get access to the stored information are document identification and descriptor.

5.2. The keynumber must originate from an existing list of descriptors. No thesaurus yet.

5.3. No hierarchical search keys are used yet, but the need is foreseen in the future.

5.4. No relations between search keys and retrieval of information can presently be considered, but the need is foreseen in the future.

5.4.1. Synonymic, hierarchical and logical links will be possible in the future, if the system is extended.

5.5. It is not yet possible to link search keys to one "search question", but this will be possible in the future if the system is extended.

6. Output of information

6.1. The output device is a printer 1403 N 1.

6.2. Teleprocessing is not foreseen at the moment.

6.3. Output information is to be processed mechanically: the computer lists will be reproduced on A 4 paper size by offset machine.

7. Updating

7.1.a) To update stored information the mutations are typed on the optically read 1288 input form.

7.1.b) To update search keys the mutations are punched on 80 column cards.

7.2. Updatings are listed at most 13 times per year. Updatings since the last complete list are listed, integrating the updatings of the several periods since the last complete list. Updatings of the last period are listed separately.

7.3. During the execution no functions can work simultaneously. One should follow the other. Although running in a multiprogramming system, the nature of the job implies a logical sequence of operation.

7.4. Updating should be done at least once a year, at most once every four weeks.

8. Special system features

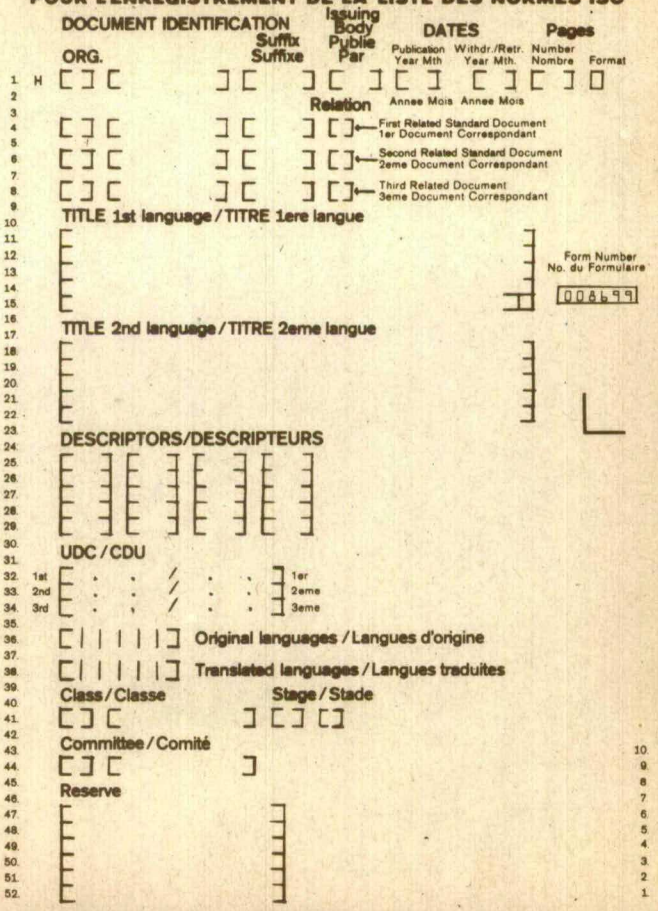
8.1. Perhaps the system is to be modified, perhaps not.

8.2. The system may be expanded. Expansions in many directions are possible, e.g.:
a) magnetic tape as third input medium
b) searching according to individual questions.

8.3. The IBM operating system, multiple fixed tasks, is necessary (IBM OS MFT 2)

8.4. No compatibility with any other system in particular has been established. Nevertheless the possiblity of exchanging information, for example with AFNOR, seems apparent.

OPTICAL READING FORM
FOR REGISTRATION OF ISO LIST OF STANDARDS
FORMULAIRE DE LECTEUR OPTIQUE
POUR L'ENREGISTREMENT DE LA LISTE DES NORMES ISO



ISO/INFCO 99
February 1973

ANNEX 9
(Copied from original)

The uniform presentation of standards catalogues

Summary

The presentation of standards catalogues is considered as a special case of the cataloguing of documents in general. Proposals for uniform presentation must be based upon relevant existing or projected international standards. Their implementation will depend upon the willingness of the standards bodies to abandon established procedures.

1. Introduction

The INFCO programme of work for 1972 (1) included an item on the preparation of a uniform presentation for standards catalogues. Emphasizing the importance of this work the Austrian member body suggested that standards catalogues should incorporate the following features:

1.1 Uniform format and layout
1.2 A minimum set of bibliographic data
1.3 Better indexes with an additional index in English or French for catalogues in languages other than these
1.4 Indication of UDC (to facilitate finding standards in lesser known languages)
1.5 Cumulative periodical supplements
1.6 In a paper presented to the third meeting of INFCO (3), the United Kingdom member body proposed the inclusion in catalogues of standard language symbols (4) to indicate the existence of translations.

2. Desirability of uniform presentation

2.1 The form, layout, language and contents of a catalogue must be suited to the needs of the user and a national standards catalogue is designed primarily for use by industry and commerce in the country concerned.

2.2 The extent to which national standards catalogues circulate outside the country of origin is unknown. It is known, however, that national standardization organizations maintain sets of national catalogues in order to deal with enquiries about foreign standards. Few other organizations consider it worth while to duplicate this information and turn to their national standards bodies when they have need of it. It therefore seems likely that the circulation of national standards catalogues is largely limited to the country of origin and standardization organizations elsewhere.

2.3 It follows that the adoption of uniform presentation must not reduce the usefulness of a national catalogue within its own country in order to increase its usefulness to a small number of users in other countries. The inclusion of extra information considered desirable by other standards bodies must not result in confused presentation making the catalogue less convenient for use in the country concerned. To summarize, for maximum usefulness to national and international organizations the main listing in a catalogue should contain information which is really useful, and nothing else.

3. Present practice

An attempt has been made to assess the extent of change required to achieve uniformity by examining the catalogues produced by the members of INFCO. The results are presented in Table I, which gives general information, and Table II which contains a breakdown of the bibliographical data included.

4. Use of a standardized presentation

These results show the wide disparity, even amongst the members of INFCO, of standards catalogues presentation. Each catalogue represents a financial investment in terms of computer programs, stored information, set-up type and familiarity of use. Each organization therefore has a financial interest in maintaining its catalogue in its present form. Hence any recommended catalogue layout would be primarily of interest to smaller organizations not yet committed to particular systems. In time other standards organizations could be expected to conform to the standard, but a careful study of their realistic requirements should precede any concrete proposals.

5. International standards

Since a standard is a particular kind of document, a catalogue of standards is a particular example of the general case. Recommendations for the uniform presentation of standards catalogues must accord with relevant international standards and take account of plans to create such standards. ISO/TC 46 should be invited to consider whether the cataloguing of documents is a proper subject for their attention as already suggested by a UNISIST working group (5). Further action on the preparation of a uniform presentation for standards catalogues should be dependent upon their advice.

6. Resolution

INFCO is invited to consider a resolution to Council in the following terms:

6.1. INFCO proposes that ISO/TC 46 be invited to consider the cataloguing of documents as a subject for international standardization.

6.2. On the basis of these considerations ISO/TC 46 is requested to advise on what measures should be taken to introduce a uniform presentation for standards catalogues, and when such measures should be put in hand.

References

(1) ISO/INFCO 91 - Brief minutes of the fourth meeting of INFCO held at ISO Central Secretariat, Geneva, 27-28 September 1971. Resolution No. 12 - INFCO Programme of work for 1972

(2) Communication: Austria fe/vt 1972-11-16

(3) ISO/INFCO 59 - International exchange and co-ordination of standards translations.

(4) ISO/R 639-1967 - Symbols for languages, countries and authorities.

(5) ISO/INFCO 104 - ISO Relationships with UNISIST (page 5)

TABLE I

GENERAL PRESENTATION OF STANDARDS CATALOGUES OF MEMBERS OF INFCO

		ON	KKCM	CSN	AFNOR	DNA	MSZH	UNI	JISC	NSF	PKNiM	SIS	BSI	ANSI	GOST	ISO	IEC
Format	A 4				x				x	x						x	
	A 5	x	x			x	x	x			x	x	x		x		x
	Other			x										x			
Standards included	National	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
	Internat.	x			x			x	x				x	x		x	x
Reference to other catalogues	ISO													x			
	IEC													x			
Translations included	In catalogue											x					
	Separate lists					x			x								
Main list(s) by order of	Number									x			x			x	x
	T.C.															x	
	UDC		x			x		x		x						x	
	Other	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Supplements issued	Periodical				x						x					x	
	Cumulative																

TABLE II

Indexes & Bibliographical data presented with EACH ENTRY in standards catalogues

		ON	KKCM	CSN	AFNOR	DNA	MSZH	UNI	JISC	NSF	PKNiM	SIS	BSI	ANSI	GOST	ISO	IEC
Identification number	Simple serial					x		x					x			x	x
	Coded	x	x	x	x		x		x	x	x	x	x	x	x		
Date		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Titles	Nat. Language	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
	English					x			x			x	x	x		x	x
	French				x	x										x	x
Abstract													x				x
Number of pages					x			x				x	x				x
Translations available												x					
UDC																	
Price or price group		x				x			x	x			x	x		x	x
Indexes	Price				x												
	Alphabetical	x	x		x	x		x	x	x	x	x	x	x	x	x	x
	Numerical		x			x	x	x			x	x			x		
	UDC		x													x	
	Other	x					x	x	x						x		

ANNEX 10

Computer output: illustrative pages

EN SEQUENCE DE CDU
IN SEQUENCE OF UDC

000.600.048/681.327.500

NUMERO D' IDENTIFICATION — TITRE
DOCUMENT IDENTIFICATION — TITLE

ISO 2033 -1972 — CODING OF CHARACTER SETS FOR MICR AND OCR
*CODAGE DES JEUX DE CARACTERES POUR RECONNAISSANCE MAGNETIQUE ET RECONNAISSANCE OPTIQUE

PUBLIE EN
DATE PUBLISHED 1972-05
PAGES
PAGES 7
DESCRIPTEURS
DESCRIPTORS
1 2 3 4
02746 03910 03353 03993
03994

COMITE
COMMITTEE ISO TC 97
CDU
UDC CCC.6CC.C48/681.327.500
681.327.500/0C0.600.048

001.110.000/691.130.000

ISO R1215 -1970 — COMMERCIALLY DRY VIRGIN CORK. RAMASSAGE, CLEANINGS, CORKWOOD REFUSE AND CORKWASTE - DEFINITIONS AND PACKAGING
*LIEGE MALE, LIEGE DE RAMASSAGE, LIEGE CISANT, REBUTS ET DECHETS COMMERCIALEMENT SECS - DEFINITIONS ET EMBALLAGE

PUBLIE EN
DATE PUBLISHED 1970-04
PAGES
PAGES 2
DESCRIPTEURS
DESCRIPTORS
1 2 3 4
03962 C331C 03C26 C3866

COMITE
COMMITTEE ISO TC 87
CDU
UDC C01.11C.000/691.130.000
691.130.000/001.110.000
658.788.400/691.130.000

001.110.000/691.130.000

ISO R1216 -1970 — COMMERCIALLY DRY CORKWOOD IN PLANKS-DEFINITIONS, CLASSIFICATION AND PACKAGING
*LIEGE EN PLANCHES COMMERCIALEMENT SEC DEFINITIONS CLASSIFICATION ET EMBALLAGE

PUBLIE EN
DATE PUBLISHED 1970-04
PAGES
PAGES 2
DESCRIPTEURS
DESCRIPTORS
1 2 3 4
03310 03861 03847 01527
03866

COMITE
COMMITTEE ISO TC 87
CDU
UDC C01.110.000/691.130.000
691.130.000/CC1.110.000
658.788.400/691.130.000

EN SEQUENCE DE
IN SEQUENCE OF

NUMERO D'IDENTIFICATION
DOCUMENT IDENTIFICATION

TITRE
TITLE

ISO * 4 -1972 DOCUMENTATION - INTERNATIONAL CODE FOR THE ABBREVIATION OF TITLES OF PERIODICALS
*DOCUMENTATION - CODE INTERNATIONAL POUR L'ABREVIATION DES TITRES DE PERIODIQUES

PUBLIE EN
DATE PUBLISHED 1972-03
PAGES
PAGES 4
DESCRIPTEURS
DESCRIPTORS
1 2 3 — 4
01739 00916 00317 01196
03488
ERRATUM 1972-05

COMITE
COMMITTEE ISO TC 46
CDU
UDC 050.000.000/655.535.200
655.535.200/003.830.000
003.830.000/050.000.000

ISO 35 -1972 NATURAL RUBBER LATEX - DETERMINATION OF MECHANICAL STABILITY
*LATEX DE CAOUTCHOUC - DETERMINATION DE LA STABILITE MECANIQUE

PUBLIE EN
DATE PUBLISHED 1972-06
PAGES
PAGES 2

COMITE
COMMITTEE ISO TC 45
CDU
UDC 678.400.031/620.170.000
620.170.000/678.400.031

ISO 69 -1972 CINEMATOGRAPHY - 16 MM MOTION-PICTURE RAW STOCK FILM - CUTTING AND PERFORATING DIMENSIONS
*CINEMATOGRAPHIE - FILMS CINEMATOGRAPHIQUE DE 16 MM VIERGES - DIMENSIONS DE COUPE ET DE PERFORATION

PUBLIE EN
DATE PUBLISHED 1972-12
PAGES
PAGES 4
DESCRIPTEURS
DESCRIPTORS
1 2 3 4
02646 03550 03710 02416
02373

COMITE
COMMITTEE ISO TC 36
CDU
UDC 778.500.000/000.000.000

ISO 94 -1972 TEXTILE MACHINERY AND ACCESSORIES
SPINDLE GAUGES FOR RING-SPINNING AND RING-DOUBLING FRAMES
*MATERIEL POUR L'INDUSTRIE TEXTILE ECARTEMENTS DES BROCHES POUR CONTINUS A FILER ET A RETORDRE A ANNEAUX

PUBLIE EN
DATE PUBLISHED 1972-02
PAGES
PAGES 1
DESCRIPTEURS
DESCRIPTORS
1 2 3 4
03830 03743 01143 03844
03843 02951 02373

COMITE
COMMITTEE ISO TC 72
CDU
UDC 677.052.300/000.000.000

EN SEQUENCE DE COMITE
IN SEQUENCE OF COMMITTEE

ISO TC 2

NUMERO D'IDENTIFICATION DOCUMENT IDENTIFICATION	TITRE TITLE		
ISO R 898 01-1968	MECHANICAL PROPERTIES OF FASTENERS. PART 1. BOLTS, SCREWS AND STUDS *CARACTERISTIQUES MECANIQUES DES ELEMENTS DE FIXATION. PREMIERE PARTIE. BOULONS, VIS ET GOUJONS	PUBLIE EN DATE PUBLISHED 1968-12 PAGES PAGES 13 DESCRIPTEURS DESCRIPTORS 1 2 3 4 00030 00350 0287C C1469 02631 00932 00946 C1576 03394 03168 03952 C1909 01217	COMITE COMMITTEE ISO TC 2 CDU UDC 621.882.539/000.000.000
ISO TC 2			
ISO R 898 02-1969	MECHANICAL PROPERTIES OF FASTENERS. NUTS WITH SPECIFIED PROOF LOAD VALUES *CARACTERISTIQUES MECANIQUES DES ELEMENTS DE FIXATION. ECROUS POUR LESQUELS DES VALEURS DE LA CHARGE D'EPREUVE SONT SPECIFIEES	PUBLIE EN DATE PUBLISHED 1969-03 PAGES PAGES 9 DESCRIPTEURS DESCRIPTORS 1 2 3 4 02470 00030 0287C C3952 01909 00350 00932 C1217	COMITE COMMITTEE ISO TC 2 CDU UDC 621.882.300/539.300.000 539.300.000/621.882.300
ISO TC 2			
ISO R 898 03-1969	MECHANICAL PROPERTIES OF FASTENERS. MARKING OF BOLTS, SCREWS, STUDS AND NUTS *CARACTERISTIQUES MECANIQUES DES ELEMENTS DE FIXATION. MARQUAGE DES BOULONS, VIS, GOUJONS ET ECROUS	PUBLIE EN DATE PUBLISHED 1969-04 PAGES PAGES 4 DESCRIPTEURS DESCRIPTORS 1 2 3 4 00030 01576 C3394 C3168 02470 0287C C3C5C C0788 03353	COMITE COMMITTEE ISO TC 2 CDU UDC 621.882.0C0/539.300.000 539.300.000/621.882.000 658.782.000/621.882.000
ISO TC 2			
ISO R1234 -197.	SPLIT PINS - METRIC SERIES *GOUPILLES FENDUES - SERIE METRIQUE	PUBLIE EN DATE PUBLISHED 1971-10 PAGES PAGES 2 DESCRIPTEURS DESCRIPTORS 1 2 3 4 02373 04085 C11C5 C0030	COMITE COMMITTEE ISO TC 2 CDU UDC 621.886.5C0/0C0.000.000

DOCUMENTS INDEX BY DESCRIPTORS IN NUMERIC ORDER 1973-01-01

00672

NR.	ENGLISH DESCRIPTOR	DESCRIPTEUR FRANCAIS	RUSSKOE KLUCHEVOE SLOVO	DEUTCHES SCHLAGWORT	PALABRA LLAVE ESPANOLA
	DOCUMENT IDENTIFICATION	DOCUMENT IDENTIFICATION	DOCUMENT IDENTIFICATION	DOCUMENT IDENTIFICATION	DOCUMENT IDENTIFICATION
	ORG LETTERS SUF	ORG LETTERS SUF	ORG LETTERS SUF	ORG LETTERS SUF	ORG LETTERS SUF
	0 AND FIX	1 AND FIX	2 AND FIX	3 AND FIX	4 AND FIX
	5 FIGURES	6 FIGURES	7 FIGURES	8 FIGURES	9 FIGURES
00672	FLASKS	FIOLE			
		CC1 ISO R1042 -1969			
		CC1 ISO R1773 -1970			
00673	PROPELLERS	HELICE			
		CC1 ISO R 482 -1966			
		CC1 ISO R 484 -1966			
00674	TAPPING THREADS	TARAUDAGE			
		CC1 ISO 2306 -1972			
00688	WIRE DRAWING	ETIRAGE DES FILS			
		CC1 ISO R 524 -1966			
00690	ROUGHNESS	RUGOSITE			
		CC1 ISO R 468 -1966			
		CC1 ISO R1302 -1971			
		CC1 ISO R1878 -1970			
		CC1 ISO R1879 -1970			
		CC1 ISO R1880 -1970			
00691	MAINTENANCE	ENTRETIEN			
		CC1 ISO R 223 -1961			
00692	MANILA HEMP	CHANVRE DE MANILLE			
		CC1 ISO R1970 -1971			

ANNEX 11 (Copied from original)

D A T R I X

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DATE 1973 - 12 - 08

PLEASE PROCESS MY ORDER FOR A DATRIX SEARCH BASED ON THE FOLLOWING KEY WORDS: (please print)

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STANDARD	ACCESSIBILITY	INTERNATIONAL		
OR STANDARDISATION	AVAILABILITY	INTERGOVERNMENTAL		
OR NORM	INDEX	FOREIGN		
OR NORMALISATION	DOCUMENTATION	WORLD		
OR ENVIRONMENT	CATALOGUE	GLOBAL		
OR	BIBLIOGRAPHY			
OR	SYSTEM			
OR	INFORMATION			
OR	RETRIEVAL			
OR	NETWORK			
OR	EXCHANGE			
OR	INTERFACE			

RECEIVED 18 DEC 1973

UNIVERSITY PREFERENCES: If search is to be limited to dissertations written at specific schools, print schools below. Otherwise, search will be made of all schools in program.

ALL SCHOOLS

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Organization KATH. HOGESCHOOL TILBURG

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A brief descriptive summary of your research goal:

TITLE OF MY THESIS:

"INTERNATIONAL ACCESSIBILITY OF STANDARDS, WITH SPECIAL REFERENCE TO THE ENVIRONMENT"

Information systems used by and between national and international standard-issuing organizations, across the borders, in order to facilitate document (i.e.standards) retrieval. Agreements between these organizations to exchange bibliographic information.

~~BILLING ADDRESS (if different)~~

After completing this form, mail it to University Microfilms, Xerox Corporation, Ann Arbor, Michigan 48106, Telephone 313-761-4700.

ANNEX II (Continued) -DATRIX REFERENCE LISTING- PAGE 1

SEARCH NUMBER- 029922 PREPARED FOR- KUIPER, B. E. 02/04/74

'STANDARDISATION' NOT IN KEYWORD LIST
'NORMALISATION' NOT IN KEYWORD LIST
'CATALOGUE' NOT IN KEYWORD LIST
'INTERFACE' NOT IN KEYWORD LIST
KEYWORDS USED IN SEARCH--

STANDARD, STANDARDISATION, NORM, NORMALISATION, ENVIRONMENT
AND
ACCESSIBILITY, AVAILABILITY, INDEX, DOCUMENTATION, CATALOGUE, BIBLIOGRAPHY, SYSTEM, INFORMATION, RETRIEVAL, NETWORK, EXCHANGE, INTERFACE
AND
INTERNATIONAL, INTERGOVERNMENTAL, FOREIGN, WORLD, GLOBAL

EXCHANGE NORMS AND POWER POLITICS A CASE STUDY OF MASS COMMUNICATIONS ON FOREIGN AID
ANDREAS, CAROL RICH TH.D. WAYNE STATE UNIVERSITY
ORDER NO 68-2082 1967 PAGE 3259 IN VOLUME 2808A OF DISSERTATION ABSTRACTS
XEROGRAPHIC COPY $10.00 MICROFILM COPY $4.00 SUBJECT -- SOCIAL PSYCHOLOGY

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	23	1.2
	38	1.6
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INDEX

Alphabetical list of subjects, referring to sections

See also: ABBREVIATIONS USED

IMOSIO: 1.2 (p.4) and 1.3 (p.8): international mission-oriented standard issuing organization, excluding international standards bodies

indexing: the representation of document content through special symbols belonging either to the original text ("extracted" key words or sentences) or a distinct indexing or "information" language - UNESCO/UNISIST/4,1971.

index of a publication: a listing in some order of matters treated with indication of their place in the publication. See ISO/R 999-1969.

information language or indexing language: a set of indicators used for expressing the content of documents in information storage and retrieval (classifications, lists of descriptors, thesauri, etc.)

information system: a set of data with an associated separation function (Nielen 1972)

integration: 6.3 (p.114): use of common subsystems

international standards body: 1.1 (p.3): ISO, IEC, IBWM and IOLM

isolated systems: 6.2.5 (p.113): having no common subsystem

keyword: word used to characterize a document in which it appears in a relevant role

language insensitive: 6.1.2.1 (p.96): accomodating all existing languages and treating all languages as equal and not relating to any natural language(s) for parameters or codes

language sensitive,completely: 6.1.2.1 (p.96): operable in one language only

level of standardization: world, regional, international, national, branch, house or individual

life-span of an information system: 1.8 sub 5(p.23): period of time between first start and final termination of operations, excluding construction and salvage periods.

literary indicator: 5.2.4 (p.76) and 5.2.5 (p.80).(See also "type of document"):of the form of documentary units, which may be specified as a standard, thesis, bibliography etc. (IAEA June 1972)

maintainability of an information system: 1.8 sub 3 (p.23): the capability to absorb changes in programming and techniques without major reconstruction.

management information system: 6.3 (p.113): a steering system used for the comprehensive governing of sets of aspects (i.e. the attributes of state and of event) which may be considered as modules (Nielen 1972)

management structure: 6.3 (p.113): the finite set of modules that contains all relevant aspects of state and event (Nielen 1972)

merging of reference information to standards from different countries on the same subject: 1.6 (p.20): See also NEN 3386, June 1974: to form a single ordered file from all data in two or more ordered files such that the ordering of any two items of data in any one of the original files is preserved in the resulting file.

metalanguage: a tool for converting one language into another

module: the set of aspects that is taken into account comprehensively and at once by one management function (Nielen 1972) Compare FID 480: a sub-subsystem or combination of components which provides a complete function to the subsystem and/or systems in which they operate.

monograph: a publication not serialized

national, multinational and international scope of information systems: see 1.3 (p.8)

network: 6.2.5 (p.113): a series of points interconnected by communication channels. See Judge 1972 in FID Publication 506.

overstandardization: 1.6 (p.19): at too early a time, at too high a level, involving too many characteristics, too narrow tolerances, too expansive tests methods for non-available equipment. Verman 1973.

precision (Dutch: relevantie): percentage of the documents retrieved which is relevant to the question asked

recall (Dutch: compleetheid): percentage of relevant documents retrieved from the total of relevant documents in a data base.

reconstructions of an information system: 4.8.4 (p.70): changes in the overall structure (cf. extensions and revisions)

record of a standard: 4.8.4 (p.70): may be considered to consist of: an identification element (standard designation or reference number),
a bibliographic description,
and content analysis elements (technical committee, information language UDC or descriptors, related standards)

reference service: 6.6.2 (p.125): information service supplying references to (citations of) documents, including a bibliographic description.

referral service: 6.6.2 (p.125): information service indicating sources or supplying addresses where further information may be obtained.

reliability of an information system: 1.8 sub 1 (p.22): the probability, as percentage, that the system responds as planned, at the time needed.

response time of an information system: 1.8 sub 6 (p.23-24): the time period between the coming into existence of an information need and the delivery of the needed information.

revisions of an information system: 4.8.3 (p.69): changes due to developments outside the system relating to elements of information within the system but leaving the overall structure unchanged (cf. extensions and reconstructions)

salvage value of an information system: 6.1.2 sub 15 (p.95): determined by the good parts selected as being usable for the next or following systems

separation function of an information system: 6.3 (p.114): procedures for applying the value-judgement of the system to data in order to separate data useful and useless to the system.

sequence: standards placed in alphanumerical order according to some identifying key(s) such as designation, UDC, committee or title.

standard: 1.1 (p.1): that which is established by authority, custom or general consent as a model or example. See also Gaillard 1933, Elfriede Beier 1960 and ISO Definitions 1971.

standardization (Dutch: normalisatie): 1.1 (p.1) and 6.1.4 (p.108): formulating and applying standards. See also ISO Definitions 1971 and Sen 1971. NNI 1968 in Grondbeginselen en leidraden voor het normalisatiewerk:"Normalisatie is ordening van het maatschappelijk verkeer door middel van normen."

switching language: 6.2.3 (p.112): a switching mechanism connecting different information languages by establishing a concordance with each vocabulary.

thesaurus: a controlled vocabulary, structured to show related terms, used to translate from natural language into information language. For definitions in terms of function and structure see ISO Draft International Standard 2788, 1972.

traffic density in an information system: 1.8 sub 8 (p.24): the actual traffic presented to the system as a fraction of the traffic capacity of the system.

traffic in an information system: 1.8 sub 8 (p.24): the number of characters of input and output per unit of time

transliteration: a transformation of a text, letter by letter, into another alphabet. See ISO/R 1087-1969.

type of document: 5.2.5 (p.80-81): a form of documentary unit. See also "literary indicator".

volume of storage: 1.8 sub 7 (p.24): the number of characters in storage.